Exabyte 18D Library

Installation and Operation

Exabyte®

321160-001

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Revision History

Revision	Date	Description
000	February 1997	Preliminary
001	April 1997	Initial release

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Boulder, Colorado 80301

321160-001

Product Warranty Caution

The Exabyte® 18D Library is warranted to be free from defects in materials, parts, and workmanship and will conform to the current product specification upon delivery. **For the specific details of your warranty, refer to your sales contract or contact the company from which the library was purchased.**

The warranty for the library shall not apply to failures of any unit when:

- The library is repaired by anyone other than the Manufacturer's personnel or approved agent.
- The library is physically abused or is used in a manner that is inconsistent with the operating instructions or product specification defined by the Manufacturer.
- The library fails because of accident, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, modification, or service by anyone other than the factory service center or its approved agent.
- The library is repaired by anyone, including an approved agent, in a manner that is contrary to the maintenance or installation instructions supplied by the Manufacturer.
- The Manufacturer's serial number tag is removed.
- The library is damaged because of improper packaging on return.

CAUTION

Returning the library in unauthorized packaging may damage the unit and void the warranty. If you are returning the library for repair, package it in its original packaging (or in replacement packaging obtained from your vendor). Refer to the packing instructions in this manual.

If problems with the library occur, contact your maintenance organization; do not void the product warranty by allowing untrained or unauthorized personnel to attempt repairs.

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded cables are required for this device to comply with FCC Rules. **Use shielded cables when connecting this device to others.**

According to FCC regulations, changes or modifications to this equipment that are not expressly approved by Exabyte could void the user's authority to operate the equipment.

Industry Canada Notice ICES-003: Class A Digital Apparatus

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicable aux appareils numériques de Classe A prescrites dans le règlement sur le broullage radioélectrique édicté par le Ministère des Communications du Canada.

English translation:
This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

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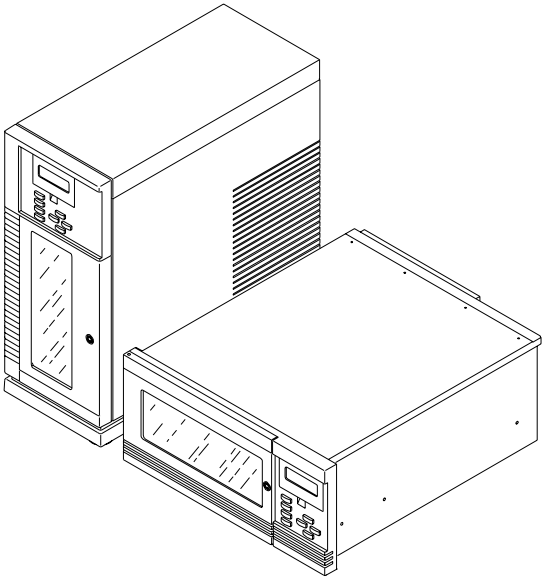
Welcome

Congratulations on selecting the Exabyte® 18D Library. Your new library provides unattended data storage, archiving, backup, and retrieval for mid-range and high-end workstations, servers, and networks. The robotic cartridge handling mechanism (CHM) automatically moves cartridges between the tape drive and storage slots, while the tape drive reads and writes data.

The library is available in standalone (vertical) and rack-mount (horizontal) models, as shown in the figure.

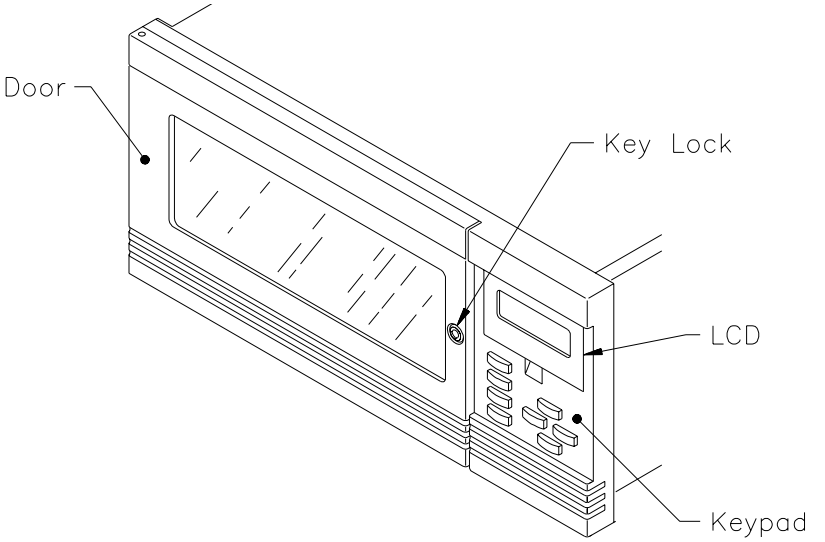


About the Exabyte 18D

The Exabyte 18D includes one Quantum® DLT™tape drive, one data cartridge magazine containing seven data cartridges, and one fixed cartridge slot for a cleaning cartridge or an extra data cartridge. It operates as two devices on one wide or narrow SCSI bus.

When operating with the DLT 7000, using eight DLT data cartridges, and assuming an average data compression ratio of 2:1, the Exabyte 18D can store up to 560 gigabytes of information.

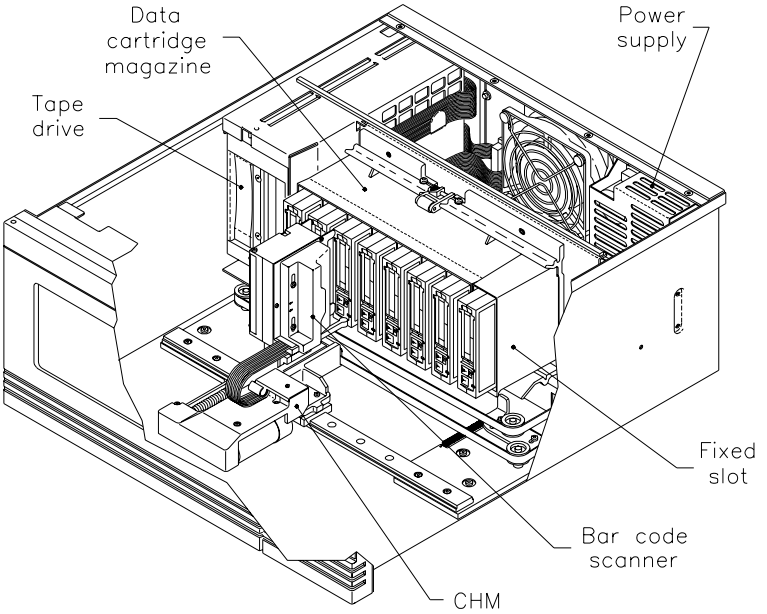
Front panel components



- **Door and key lock.** The front door features a key lock that enables you to lock the door for data security.

- **LCD and keypad (operator panel).** The LCD (liquid crystal display) and keypad allow you to view the operational status of the library, access a menu of operations, and view status messages. If necessary, you can tilt the LCD for easier viewing.

Internal components

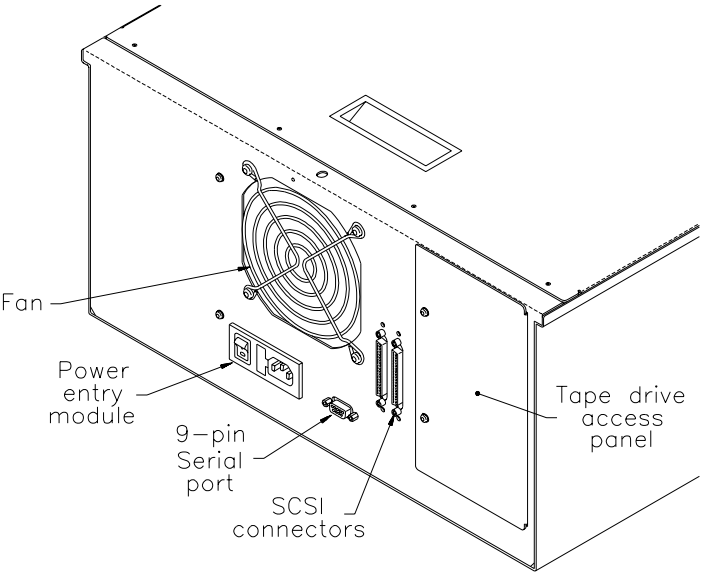


- **Tape drive.** The library includes one Quantum DLT tape drive, which is installed in the library using special Exabyte mounting rails (see page 77).

- **Data cartridge magazine and fixed slot.** The Exabyte 18D includes one cartridge magazine that stores up to seven DLT cartridges. The fixed slot allows you to store a cleaning cartridge or an additional data cartridge.

- **CHM (cartridge handling mechanism)**. The CHM is the robotic assembly that moves cartridges between the storage locations and the tape drive. The CHM can also include a bar code scanner, which reads bar code labels affixed to the cartridges.

Back panel components



- **Fan and power entry module.** The fan reduces the library's operating temperature. The power entry module includes the AC power connector, power switch, and fuse drawer.

- **9-pin serial port.** The serial port allows you to connect a serial cable and terminal for library diagnostics.

- **SCSI connectors.** The two SCSI connectors allow you to connect the library (and tape drive) to the SCSI bus.

About this manual

Use this manual for installing, operating, and maintaining the library.

Conventions used in this manual

This manual uses the following conventions:

Enter Boxed text indicates keys on the operator panel.

Note: Notes provide additional information.

➤ **Important** Information next to the word "Important" helps you complete a procedure or avoid extra steps.

CAUTION

Boxed text under the word "CAUTION" provides information you must know to avoid damaging the library or tape drive or losing data.

WARNING!

Boxed text under the heading "WARNING!" provides information you must know to avoid personal injury.

Related publications

- *Exabyte 18D Library Product Specification*, 321161
- *Exabyte 18D Library SCSI Reference*, 321162
- *Exabyte Bar Code Label Specification for DLT Cartridges*, 321195

Contacting Exabyte

For technical support:	
Exabyte Technical Support	1-800-445-7736
	1-303-417-7792
	1-303-417-7160 (fax)
e-mail	support@exabyte.com
EXAFacts™ Fax-on-Demand	1-800-445-7736
	1-303-417-7792
World Wide Web	http://www.exabyte.com
Bulletin Board (BBS)	1-303-417-7100 Connect at up to 28,800 baud with 8 data bits, 1 stop bit, and no parity. Turn on hardware (RTS/CTS) flow control.
To order supplies and accessories:	
Exabyte Express	1-800-EXATAPE (1-800-392-8273)
	1-214-481-4221
	1-214-620-8564 (fax)
To return equipment for service:	
Exabyte Service	1-800-EXATAPE (1-800-392-8273)
	1-303-442-4333
	Scotland: (44) 1324-564564
e-mail	service@exabyte.com

Notes

1 Installation and Setup

This chapter describes how to install and set up your library.

Preparing for installation

This section provides step-by-step instructions for preparing the library. You can use the table below as a checklist.

✔	Step	Description
	1	Unpack the library.
	2	Obtain accessories and equipment.
	3	Prepare the host computer.
	4	Prepare the library for installation.

Step 1 – Unpack the library

Complete the unpacking steps printed on the box. Save all the original packing materials in case you need to ship or move the library later.

Step 2 – Obtain accessories and equipment

Make certain you have all the accessories and equipment for library operation, as indicated on the accessory card included with your library.

Step 3 – Prepare the host computer

Make certain the SCSI host bus adapter card installed in the computer and the application software are compatible with the Exabyte 18D Library. You can obtain software compatibility information for Exabyte products from Exabyte's internet site (http://www.exabyte.com) or from EXAFacts™, Exabyte's fax-on-demand service.

Note: If your application does not support the library but does support the DLT tape drive, you can run the library in sequential mode (see page 44 and Appendix D).

Or, if your application supports the Exabyte 210 8mm Library but not the Exabyte 18D, you can set the EXB-210 Emulation option. This option enables the library to operate with most software applications that provide drivers for the EXB-210. For more information, see page 35.

You can install the software application on the host computer before or after library installation. However, if you install the software first, you may need to reconfigure it for use with the library.

Step 4 – Prepare the library for installation

Prepare the library as follows:

- Ensure that the work area is free from conditions that could cause electrostatic discharge (ESD). Discharge static electricity from your body by touching a known grounded surface, such as your computer's metal chassis.

- Locate an appropriate area for the library. The library must have a level surface near a readily accessible outlet. (If you have a standalone library, adjust the feet to make it level.) In addition, there must be approximately four inches (10.2 cm) of open area behind the library for adequate air flow.

Installing the library hardware

This section provides step-by-step instructions for installing the library hardware. You can use the table below as a checklist.

✔	Step	Description
	1	Install the library into a rack, if you have a rack-mount model.
	2	Unlock and open the front door.
	3	Remove the packing foam.
	4	Prepare and install cartridges.
	5	Close and lock the door.
	6	Connect the library to the SCSI bus.
	7	Connect the power cord.
	8	Power on the library.

Step 1 – Install the library into a rack

WARNING!

Before performing any installation or maintenance procedures, be sure that the library power switch is in the off position and that the power cord is disconnected from the library and the outlet.

If you have a rack-mount library, follow these instructions to install the library into a standard EIA 19-inch rack.

WARNING!

The rack-mount library weighs 78.7 pounds (85.7 kg); the standalone library weighs 106.7 pounds (48.4 kg). These weights include the cartridge magazine. At least 2 people are needed to move or lift the library. Most of the weight is toward the back of the library.

Make sure you install the rack-mount library in the lowest possible location in the rack. For best results, use a rack with extension support legs.

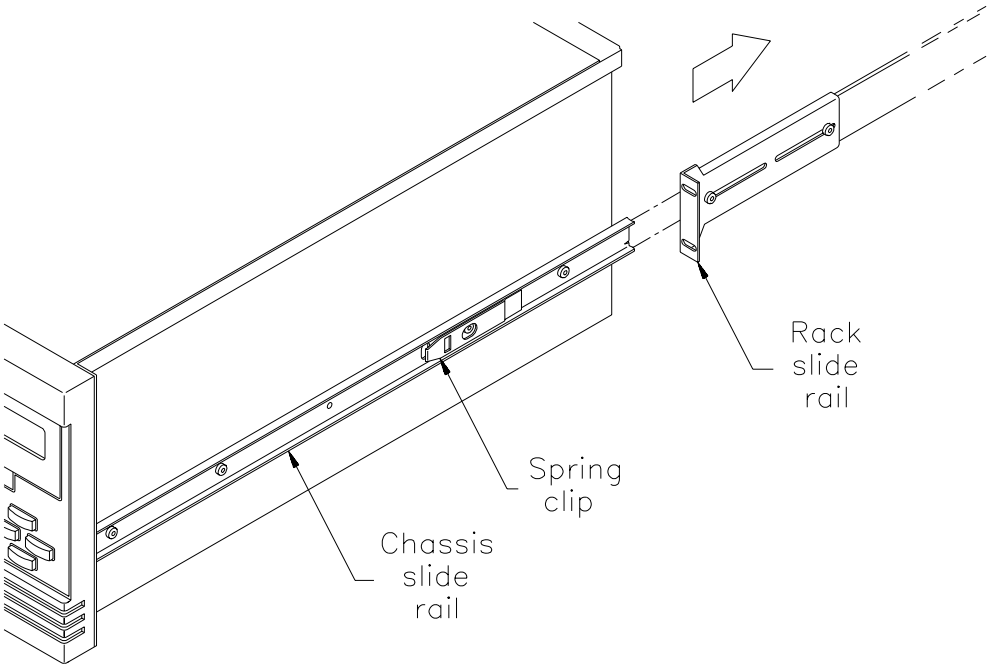
For this procedure, you will need the following:

- Standard EIA 19-inch rack
- TORX screwdriver with T-25 bit
- T-15 bit, if you need to extend the rails
- Eight 10-32 × 0.5 truss head screws (provided in the accessory box)
- Eight clip nuts (provided in the accessory box), necessary if the rack does not have threaded holes

To install the library into a rack:

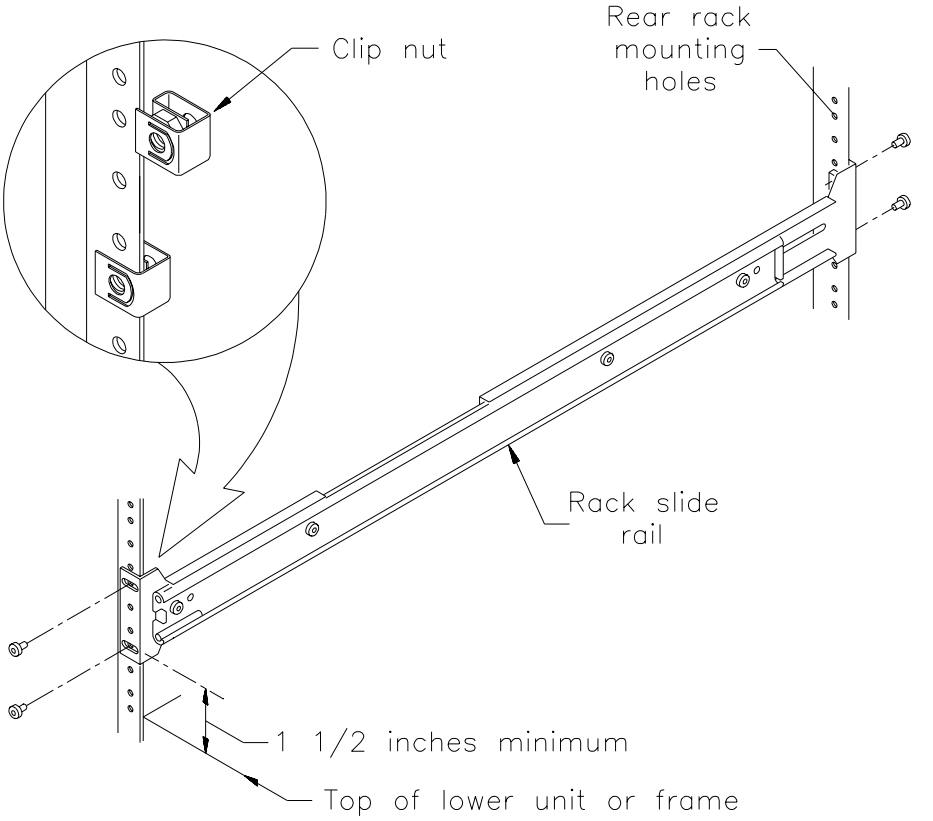
1. Locate the slide rail assembly attached to each side of the library chassis, as shown in the figure.

2. Slide the rack-slide rail toward the rear of the library, as shown in the figure. Press the spring clips to remove the rack-slide rail from the chassis-slide rail.

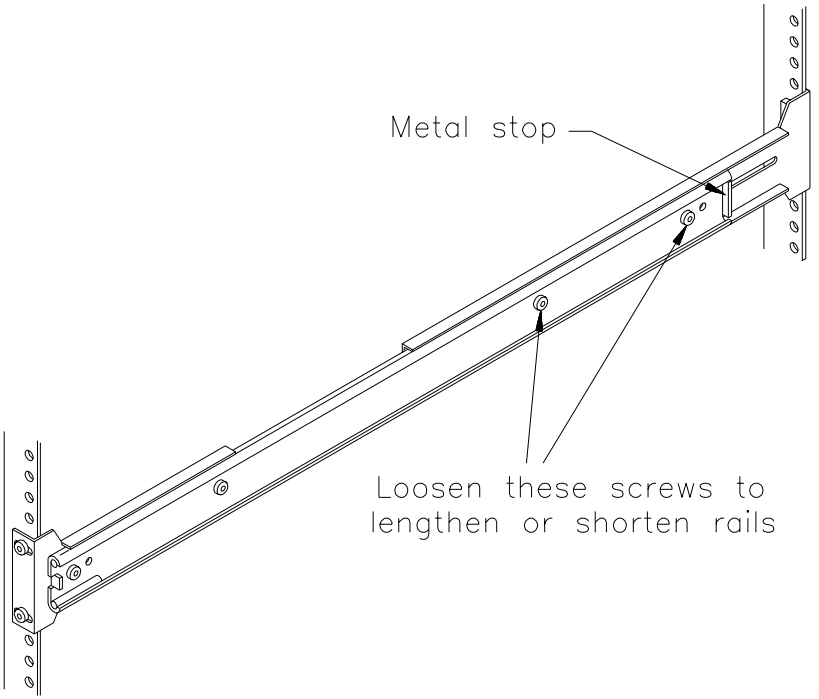


3. Locate the mounting holes on the rack where you want to install the library. Allow 1½ inches (3.8 cm) minimum clearance below the bottom mounting hole.

Note: If the rack does not have threaded holes, attach the clip nuts provided with the library over the mounting holes, as shown in the figure.



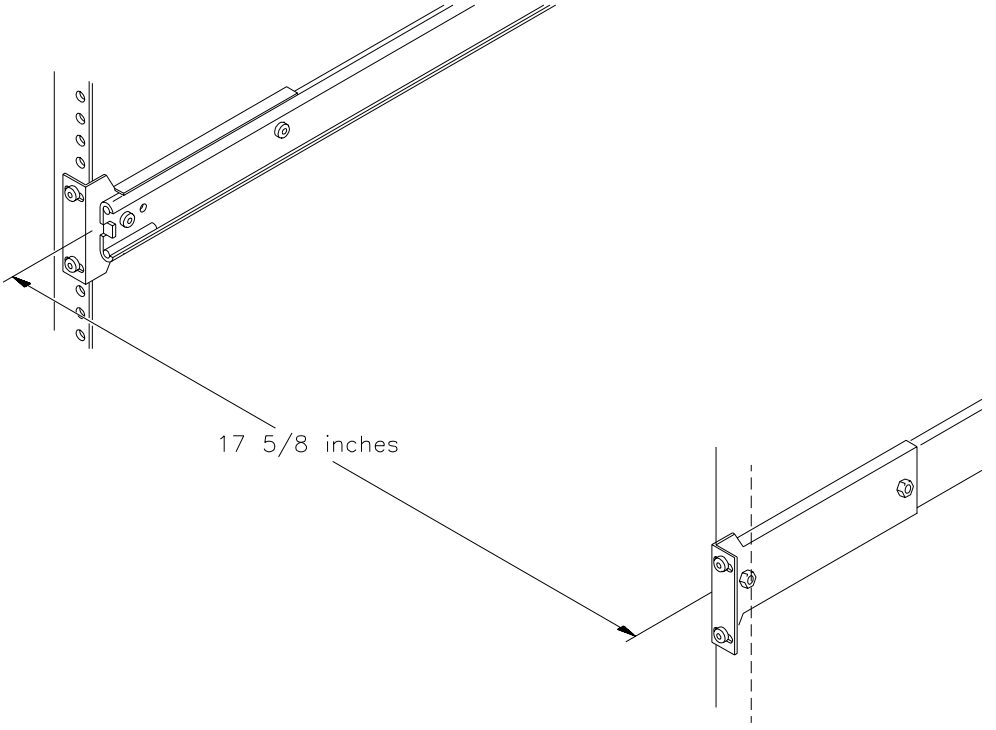
4. Orient the rack-slide rails so that the metal stop is towards the back of the cabinet, as shown in the figure. If the rails are not long enough to reach the back of the cabinet, use a T-15 TORX driver to loosen the nuts on the rails. Extend the rails to the desired length and tighten the nuts.



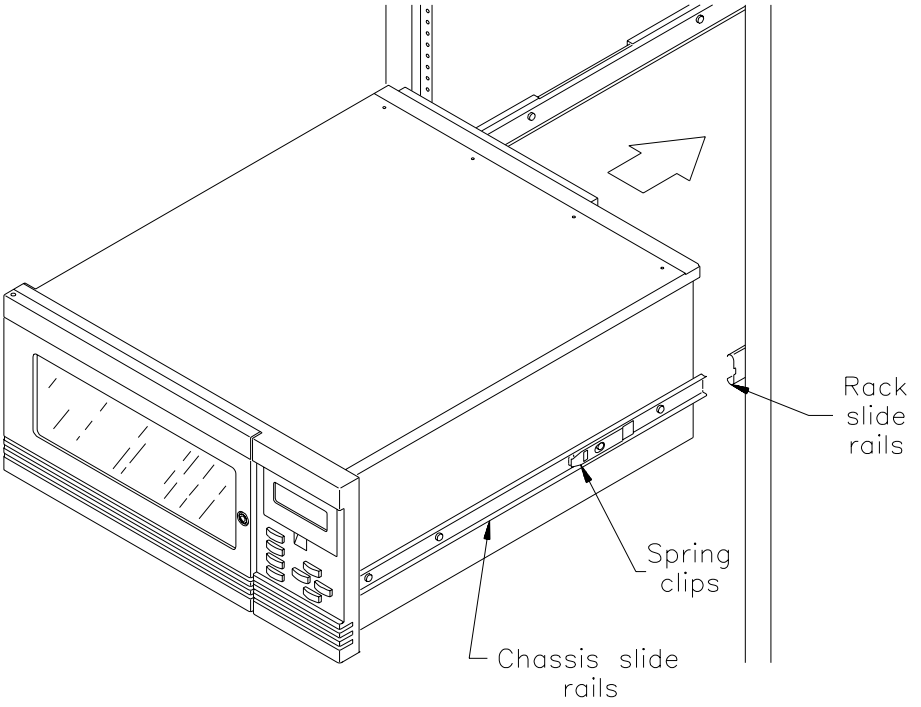
5. Using a T-25 TORX driver and four screws per rail, attach (but do not tighten) the rack slide rails to the mounting holes on the rack, as shown in the figure on page 8.

6. Adjust the distance between the rail brackets on each side of the cabinet to 17 5/8 inches (44.75 cm). Measure both the front and back.

7. Use a T-25 TORX screwdriver to tighten the screws to 12.0 inch-pounds (13.8 kg-cm) of torque.

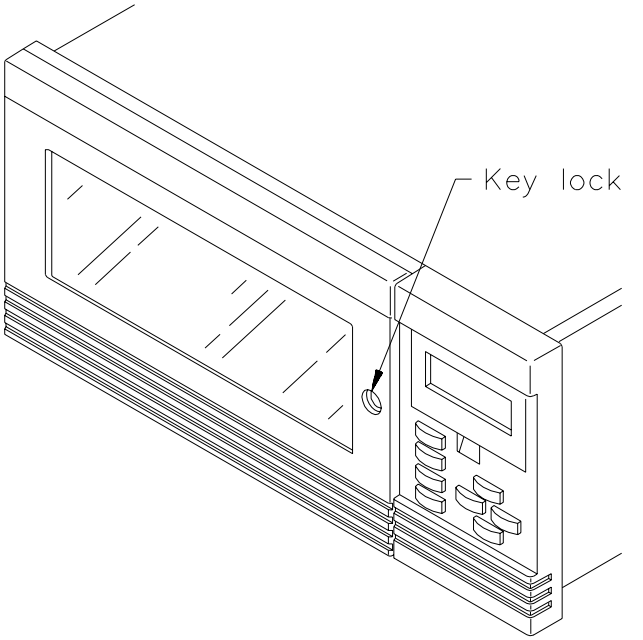


8. Using two people to lift it, slide the library into the rack by inserting the chassis slide rails into the rack slide rails, as shown in the figure. Press the spring clips while pushing the library firmly into the rack. When the library is seated properly, you will hear the latch engage.



Step 2 – Unlock and open the front door

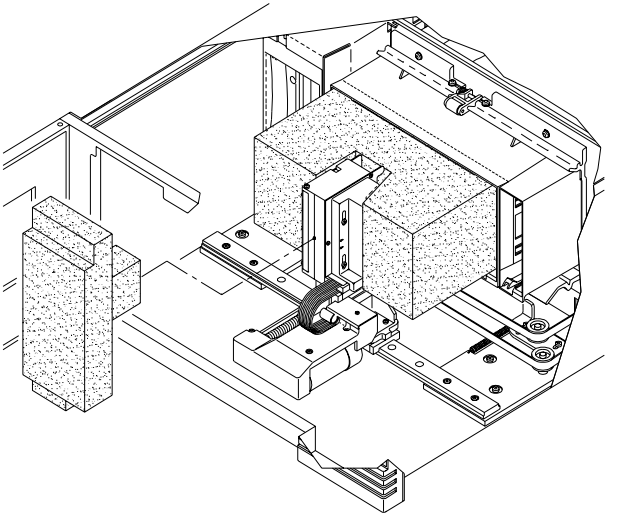
To open the front door, insert the key from your accessory kit into the lock, push in, and turn the key one-quarter turn to the right. Pull open the door.



Step 3 – Remove the packing foam

To remove the two foam packing pieces:

1. From inside the door, remove the first foam packing piece (rack-mount model shown below).



2. To remove the second foam packing piece, you must first move the cartridge handling mechanism (CHM) out and away from the magazine, as described on the next page.

➤ **Important** If the CHM contains a bar code scanner, do not touch the lens when you move the CHM. Smudges on the lens can cause scan errors.

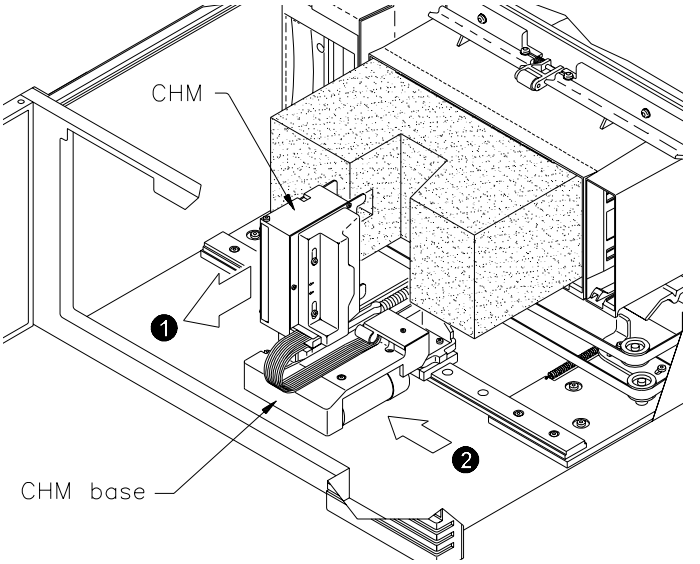
---

3. When the CHM is out of the way, remove the second foam packing piece from the magazine. Save the packing pieces with the other library packing materials.

Rack-mount model:

❶ Pull firmly on the *upper portion* of the CHM to slide it back (toward you). Do not pull on the CHM base.

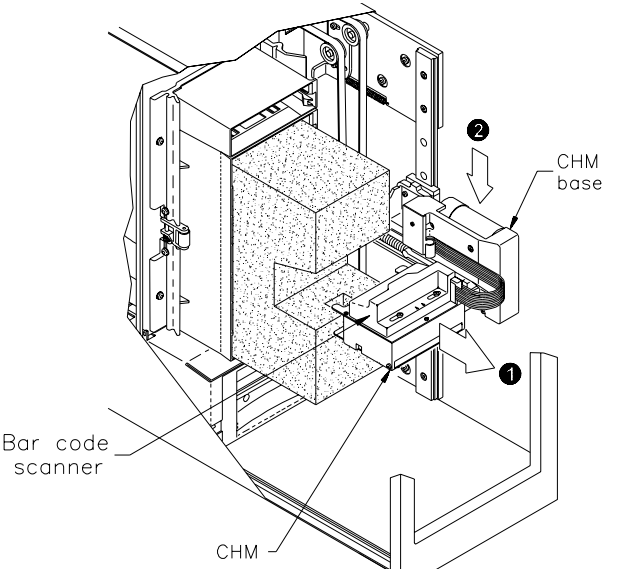
❷ Push against the CHM base, sliding it firmly to the right or left.



Standalone model:

❶ Pull firmly on the *upper portion* of the CHM to slide it back (toward you). Do not pull on the CHM base.

❷ Push against the CHM base, sliding it firmly to the top or bottom.



Step 4 – Prepare and install cartridges

Exabyte recommends EXATAPE™IV data cartridges. To prepare and install cartridges:

1. If your library includes a bar code scanner, determine whether your bar code labels contain checksum characters by contacting your label vendor or by following steps a to d.

Note: For information about preparing bar code labels, refer to the *Exabyte Bar Code Label Specification for DLT Cartridges*. Sample bar code labels provided by Exabyte do not contain checksum characters.

a. Count the number of black bars on the label. (The number will be a multiple of 5.)

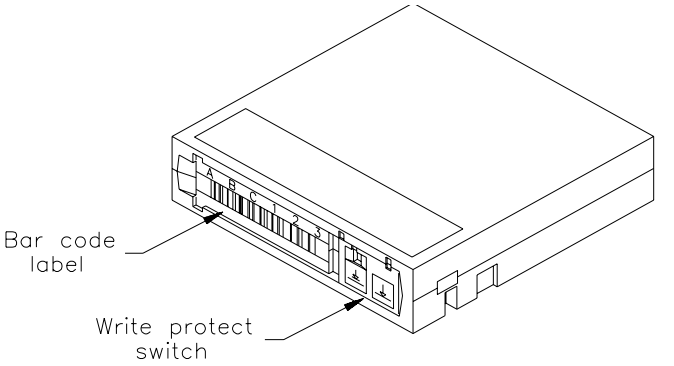
b. Divide this number by 5 to get the number of characters.

c. Subtract the number of human-readable characters on the label from the result of step b. If the remainder is 2, the label does not include a checksum character; if the remainder is 3, the label includes a checksum character.

d. If the labels contain checksum characters, be sure to set the Chksum Labels configuration option to ON (see page 35).

➤ **Important** Do not mix labels containing checksum characters with labels that do not contain checksum characters in the library.

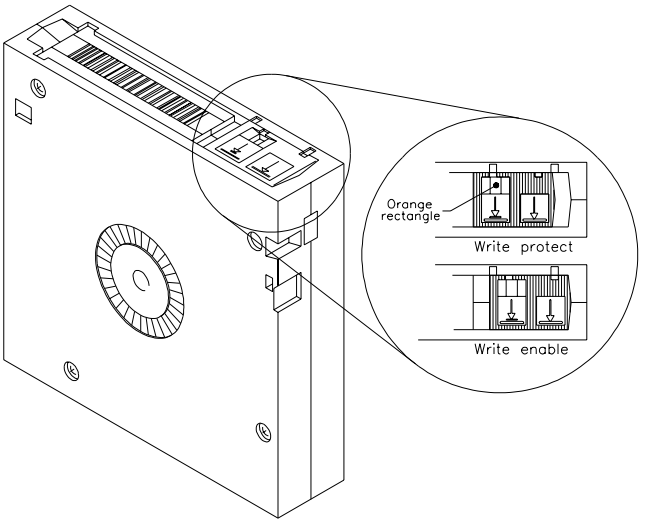
2. If your library includes a bar code scanner, attach bar code labels to the cartridges. Orient the labels as shown in the figure on the following page.



3. Make sure the write-protect switch on the cartridge is set correctly for your operation, as shown in the following figure. To do so, hold the cartridge with the label facing up, and the two arrows pointing down. The write-protect switch comprises both of the arrows and slides back and forth.

- To write protect the cartridge, slide the switch to the left. This reveals an orange rectangle above the arrow.

- To write enable the cartridge, slide the switch to the right. This hides the orange rectangle.

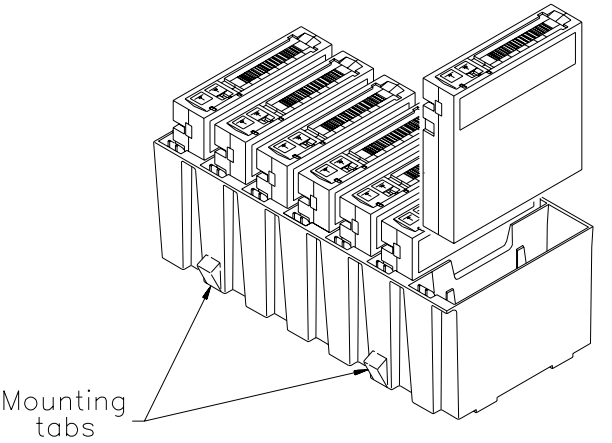


4. Remove the cartridge magazine (shown in the following figure). For rack-mount models, pull it out first from the top, then the bottom; for standalone models, pull it out first from the left, and then right.

> **CAUTION**
>
> Make sure the CHM and its cabling are safely out of the way before you remove or install a cartridge magazine. If the CHM is blocking the magazine, move it by following the instructions on page 14.

5. Place the magazine on its feet with the two mounting tabs toward you. Position each cartridge with the bar code label and write-protect switch facing up, with the switch closest to you. Insert the cartridge into the magazine slot. When the cartridge is seated, a plastic tab in the magazine slot moves into an indentation on the cartridge.

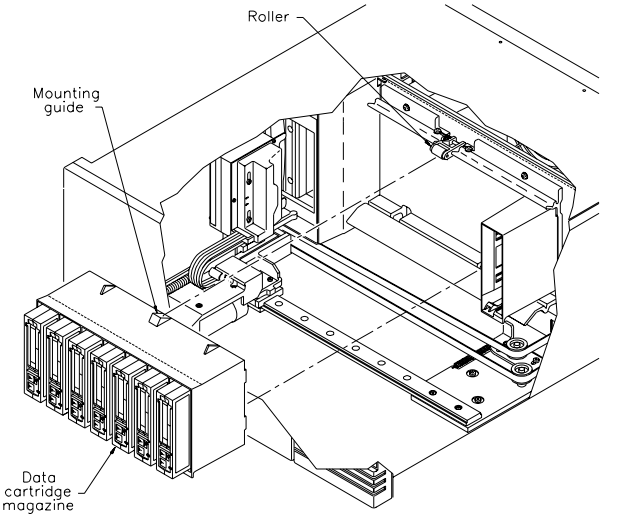
Note: Very little force is needed to install a data cartridge. If you experience problems, check the orientation of the cartridge.



6. To re-install the magazine, follow the instructions below.

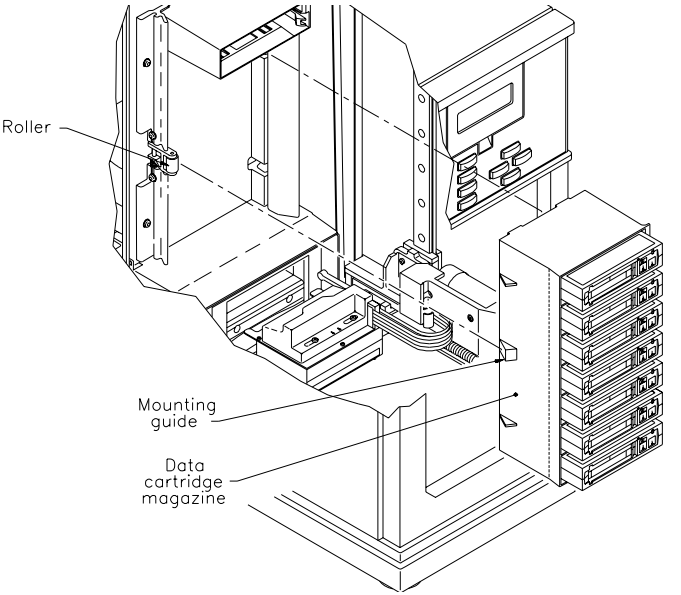
Rack-mount model:

Position the magazine so that the two mounting tabs are down. Insert the lower side first, then push the magazine into place under the roller on the upper side.



Standalone model:

Position the magazine so that the two mounting tabs are to the right. Insert the right side first, then push the magazine into place under the roller on the left side.

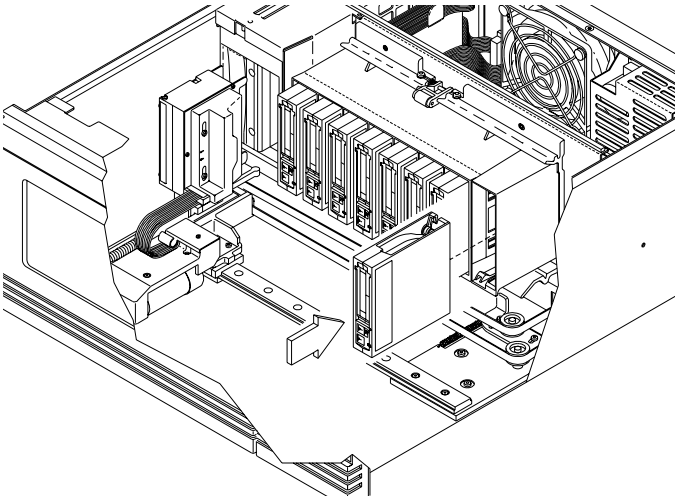


7. The library contains one fixed cartridge slot for a cleaning cartridge or an additional data cartridge. If desired, install a cleaning cartridge in the fixed cartridge slot, as shown on the following page.

> **CAUTION**
>
> Use DLT CleaningTape III only. Using cloth swabs, cotton swabs, cleaning agents, or cleaning cartridges not approved by Exabyte may void the tape drive warranty.

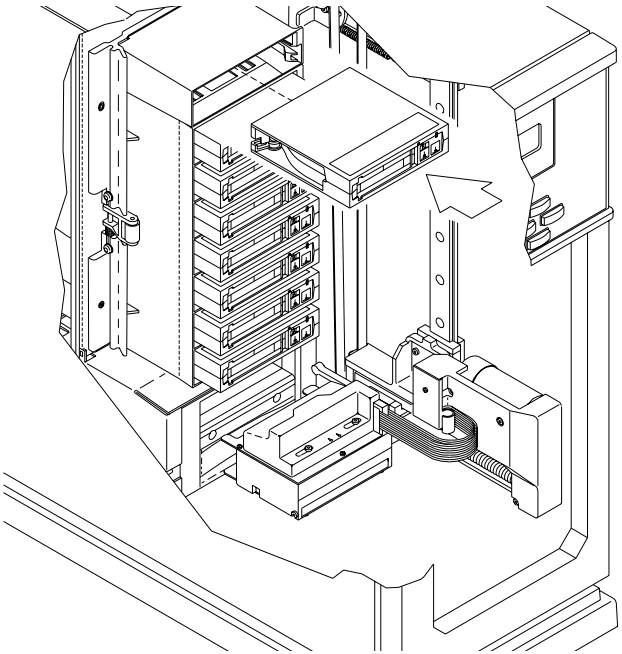
Rack-mount model:

Position the cleaning cartridge vertically, with the spindle to the left and the label to the right. (The cartridge will not go in any other way.) Insert the cartridge into the fixed cartridge slot. Make sure that the plastic tab in the slot moves into the indentation on the cartridge.



Standalone model:

Position the cleaning cartridge horizontally with the spindle facing down and the label facing up. (The cartridge will not go in any other way.) Insert the cartridge into the fixed cartridge slot. Make sure that the plastic tab in the slot moves into the indentation on the cartridge.



Step 5 – Close and lock the door

Close the door and turn the key a quarter-turn to the left.

Step 6 – Connect the library to the SCSI bus

This section provides general guidelines for connecting the library to the SCSI bus. The library consists of two SCSI devices: the library itself and the tape drive.

Before you begin

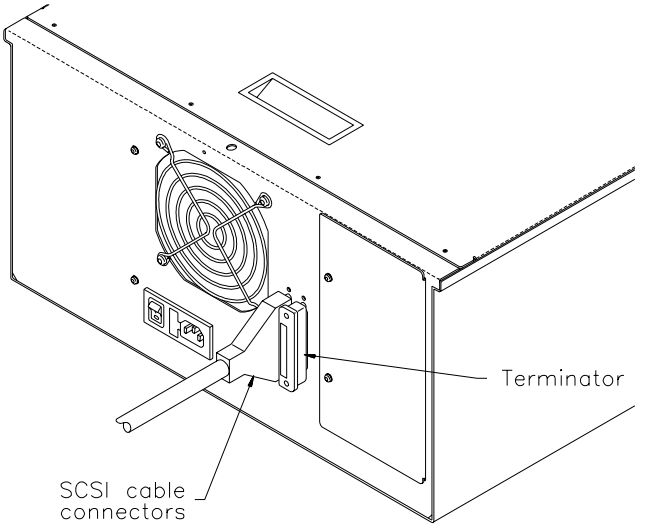
1. Make certain the host computer and any peripheral devices are turned off.

> **CAUTION**
>
> To avoid damaging the tape drive, make sure the tape drive and library are powered off when you connect the library to the SCSI bus.

2. If you are unfamiliar with connecting devices on a SCSI bus, first read Appendix B.

3. As shown in the figure, connect a SCSI cable to either connector.

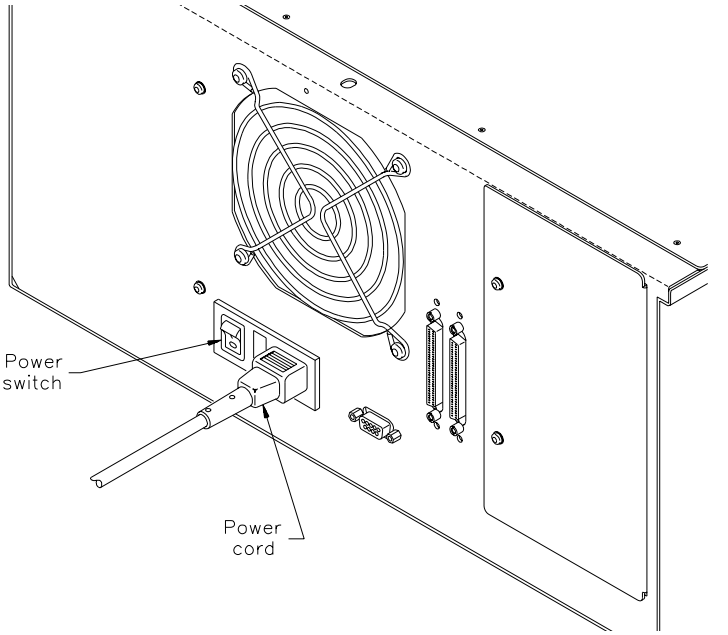
4. If the library will terminate the SCSI bus, install a terminator on the other connector. If the library will not terminate the SCSI bus, install another SCSI cable on the other connector.



Step 7 – Connect the power cord

➤ **Important** The power cord shipped with the library is a 120 VAC three-conductor power cord for use in the United States and Canada. If you are planning to use an input voltage other than 120 volts AC or if you plan to use the library outside of the United States or Canada, you must supply your own power cord. Refer to Appendix A for more information.

1. Make sure that the power switch on the back of the library is off (the **0** is pressed).



2. Connect the female end of the power cord to the power connector on the back of the library.

3. Plug the male end of the power cord into the power source.

Note: The library has autoranging voltage selection, so you do not need to change the voltage setting.

Step 8 – Power on the library

1. Make certain the library's door is closed and locked.

2. Turn on the host computer system.

   Note: If your host system requires that attached peripheral devices be powered on before the host, turn on the library before you turn on the host.

3. Push the power switch on the back of the library to the on position (the **I** is pressed).

Wait while the library performs its power-on sequence. During this time, the following activities occur:

- The cooling fan begins to rotate.
- The LCD illuminates and displays the Main Screen.
- If a data cartridge is protruding from the tape drive (that is, the tape drive is open), the CHM pushes the data cartridge into the tape drive and closes the tape drive handle.
- The tape drive and library perform a power-on self-test.
- The tape drive indicates that it is ready by illuminating the Operate Handle LED.

If problems occur . . .

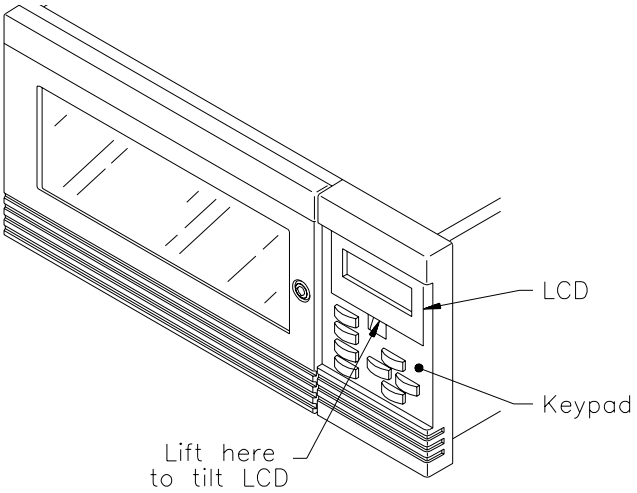
If the library does not power on as described:	Check the following: ▪ Is the power switch on (**I**)? ▪ Is the power cord inserted correctly? ▪ Is the library door closed and locked? ▪ Is the SCSI bus terminated? ▪ Is the SCSI cable connected to the library and host computer? ▪ Is the host computer system turned on? For additional troubleshooting tips, see page 134, "Problems with library installation."
If an error code is displayed on the LCD:	See Appendix C for a list of error codes and corrective actions.
If you cannot solve the problem yourself:	Contact your service provider or Exabyte.

Configuring the library

Configuration steps include:

- Displaying the Configuration Menu
- Setting SCSI IDs
- Setting LCD security (optional)
- Setting other configuration options (if necessary)

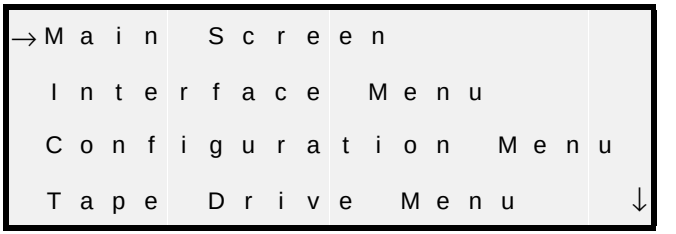
To change options, you will use the operator panel (LCD and keypad) on the front of the library, as shown in the figure. If desired, you can tilt the LCD for easier viewing.



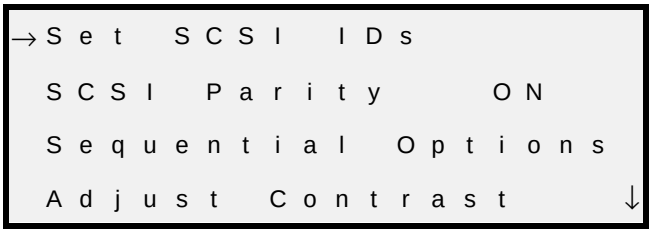
Step 1 – Display the Configuration Menu

To display the Configuration Menu:

1. Access the Main Menu by pressing Escape on the keypad. The Main Menu is shown below.



2. Press ↓ to scroll down to Configuration Menu. Then press Enter. The Configuration Menu displays:



During library configuration, use the operator keys for the following functions:

To select an item from a menu:	Press ↑ or ↓ to scroll up and down through the items. When the screen arrow (→) points to the desired item, press Enter.
To move the screen arrow left and right, or toggle some options:	Press ← or →.
To return to a previous screen or cancel the operation without saving:	Press Escape.
To redisplay the Main Screen:	Select Main Screen (the first item in the Main Menu) and press Enter.

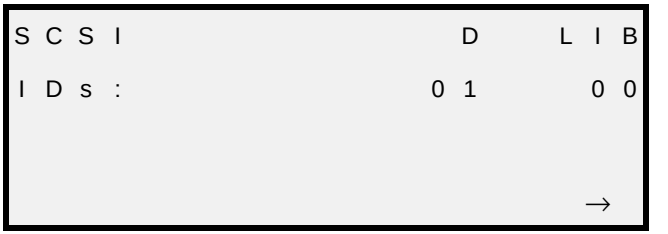
Step 2 – Set the SCSI IDs

Default SCSI IDs are assigned at the factory for the library and tape drive. This section describes how to view the default settings and change them if necessary.

➤ **Important** The library and tape drive must each have a unique SCSI ID. The library does not allow duplicate IDs for the tape drive and library; however, it is your responsibility to make sure there are not other duplicates within the bus.

To view or change the SCSI IDs:

1. From the Configuration Menu, select Set SCSI IDs. The following screen appears:



2. To set the SCSI ID for the tape drive, press ↑ or ↓ until the screen displays the correct SCSI ID.

3. Press → to move the screen arrows to LIB.

4. To set the SCSI ID for the library, press ↑ or ↓ until the screen displays the correct SCSI ID.

5. When the SCSI IDs for the tape drive and library are correct, press Enter to accept your choices.

6. If you have changed the tape drive ID, the system displays the message: `WAITING FOR DRIVE`. The system resets the tape drive and returns you to the Configuration Menu.

Step 3 – Set security

The Security option allows you to prevent unauthorized personnel from disrupting the operation of the library. When you enable security, the following activities are prevented:

- Changing SCSI IDs
- Changing SCSI parity checking

- Changing the control mode
- Changing the library serial number
- Using the Diagnostics Menu and the Demo Menu
- Unloading or opening the tape drive
- Using the Clean Tape Drive option
- Changing the 210 Emulation mode
- Changing the Chksum Labels option
- Opening the front door (operator panel security only)

If you attempt to perform any of the above operations when security is enabled, the library displays a message that states security is active. The message also states whether security was enabled from the operator panel or by the application with a SCSI command.

Methods for enabling and disabling security

Security can be enabled or disabled in either of two ways:

- You can set the security option from the operator panel using the Configuration Menu, as described in this section.

- The application software can issue a SCSI MODE SELECT command to turn security on or off (see your software documentation or the *Exabyte 18D Library SCSI Reference*).

Whichever method is used to enable security (operator panel or SCSI) must also be used to disable security. That is, if you enable security from the operator panel, you must disable it from the operator panel. If security is enabled by the application (SCSI), it must be disabled by the application.

Note: To determine if security has been set by your application, look at the SCSI Mode Parameters screen (see page 101).

Security remains in effect across resets.

Enabling security from the operator panel

1. From the Configuration Menu, select Set Security On. The following screen appears:

Note: If the menu displays Set Security Off, the security option has already been enabled.

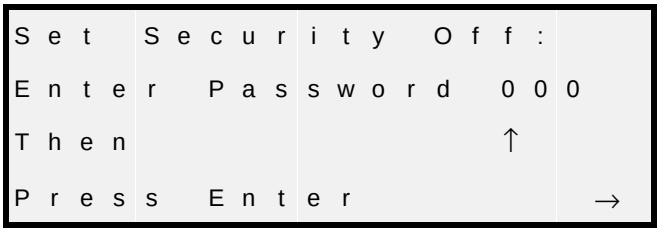
2. Select a three-digit password. Press → and ← to move from column to column and ↑ and ↓ to change the numbers. (The default password is 000.) When you are finished, press Enter.

➤ **Important** You must use the same password to turn security off.

3. A confirmation message appears. Press Enter. Or, to exit without saving the password, press Escape.

Disabling security from the operator panel

1. From the Configuration Menu, select Set Security Off. The following screen appears:



Note: If the menu displays Set Security On, the operator panel security function is disabled. However, security may have been enabled by your application using a SCSI command. If so, it must be disabled by your application. Refer to your software documentation or to the *Exabyte 18D Library SCSI Reference*.

2. To specify the three-digit password, press → and ← to move from column to column and ↑ and ↓ to change the numbers. When you are finished, press Enter.

If you enter the wrong password, the system displays an error message.

If You Forget the Password Try entering the default password (000). If the default password has been changed and you do not know what it is, call your service provider.

Step 4 – Set other configuration options

The Configuration Menu contains some other configuration options for the library, as described in the table below. If desired, you can check these settings and change them.

Configuration options	
SCSI Parity*	Allows you to enable parity checking for the library (if the SCSI adapter card connected to the library supports it). When this option is enabled, the library checks all data coming across the SCSI bus for parity. The setting remains in effect across power cycles.
Sequential Options	Provides options for using the library's sequential mode. (See page 44 and Appendix D for more information.)
Adjust Contrast	Controls the brightness of the lettering on the LCD.
Set Time	Allows you to set the time that is shown on the library's Main Screen and in the Command History screen (see Chapter 6 for more information).
Back Light	Turns the LCD background on or off.
Set Date	Allows you to set the system date for the library. The date appears on the Command History screen and on diagnostic listings (see Chapter 6 for more information).
Set Serial Number	Allows you to change the serial number, which may be displayed on this screen. (The serial number entered in this screen appears on diagnostic listings; see Chapter 6 for more information.)

Configuration options	
210 Emulation	Allows you to set the library to 210 Emulation mode. In this mode, the library returns "EXB-210" in response to a SCSI INQUIRY command. This allows you to use most (but not all) application software packages that provide a driver for the EXB-210 library but not for the Exabyte 18D.
Chksum Labels	Allows you to specify whether your bar code labels include a checksum character (see page 15). When this option is ON, the library expects to find a checksum character on each label and compares this character to the checksum it calculates for the bar code. When this option is OFF, the library does not look for checksum characters. **Important:** Do not mix labels containing checksum characters with labels that do not contain checksum characters.

* Parity checking for the library can also be enabled by the application software using the SCSI command, MODE SELECT. The method used last to set parity checking (LCD or SCSI command) has precedence.

Checking the setup

After installing the hardware and software, check the setup by performing some exercises on the library, as described below. (While these exercises are not required, it is a good idea to verify that your software and hardware are properly communicating before you begin operations.)

- Use the options on the Diagnostic Menu to exercise the hardware. This determines whether the library hardware components are operating properly. See page 121 for more information about library diagnostics.

- Instruct the application software to load some cartridges into the tape drive. This determines whether the software and library are communicating properly.

- Back up several megabytes of data and perform a comparison check on the backed up data. This determines whether the software and tape drive are communicating properly.

If problems occur . . .

If the library and tape drive are not operating as expected:	See Chapter 7 for troubleshooting information.
If there is an error code displayed on the LCD:	See Appendix C for a list of error codes and corrective actions.
If you cannot solve the problem yourself:	Contact your service provider or Exabyte.

Where to go from here

Before you begin library operations, check the following:

✔ A cartridge magazine is installed.

✔ The CHM gripper does not contain a cartridge.

✔ The library door is closed and locked.

✔ The library is in the proper control mode. The standard operating mode is SCSI. (See page 43.)

2 Library Operation

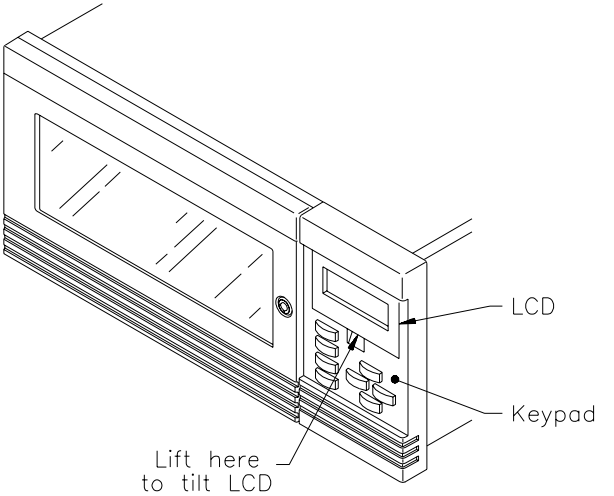
Once the library and application software are installed and configured, you can automatically perform backup and restore operations using the application software. You do not need to intervene in the cartridge processing during normal library operations.

This chapter describes library operations you may occasionally need to perform:

- Using the operator panel
- Operating the library in different control modes
- Replacing data cartridges
- Removing a stuck data cartridge from the gripper
- Resetting the library

Using the operator panel

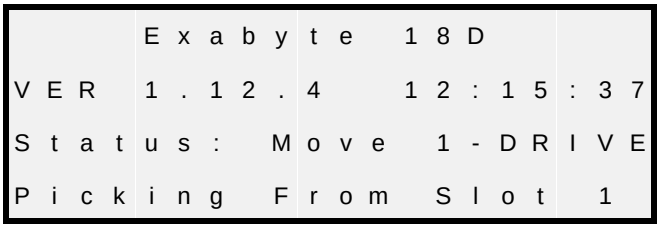
The library includes a four-line LCD and keypad, called the *operator panel*, which allows you to interactively control library operations. Using the operator panel, you can set library options, check operating statistics, and diagnose errors. If desired, you can tilt the LCD for easier viewing.



Main Screen

The Main Screen appears when you apply power to the library. The first and second lines on the Main Screen identify the product name, firmware version, and time. The third and fourth lines display status information about the library or tape drive; and if a hardware error occurs, these lines display information about the error.

An example of the Main Screen with a status message is shown below.

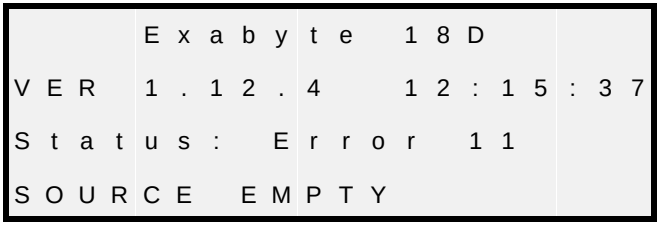


Note: The exact wording of the Main Screen may be different on your screen.

Error codes

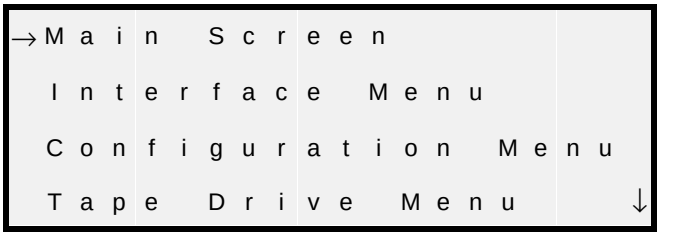
If a hardware error occurs, an error code will appear automatically on the third and fourth lines of the Main Screen. You must correct the error before operation can continue. (Refer to Appendix C for help in diagnosing and correcting errors.)

The third line provides the error's numerical code; the fourth line provides a brief explanation of the error.



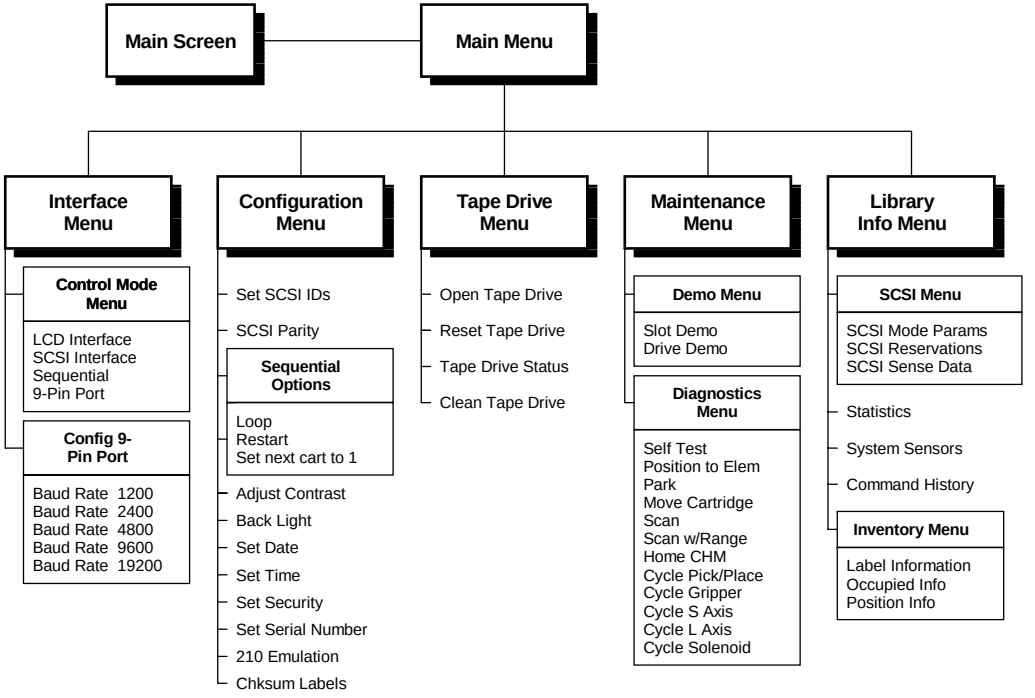
Main Menu

To access the Main Menu, press Escape from the Main Screen. The Main Menu is shown below:



The selections on the Main Menu are described in the following table. The menu structure is shown on the next page.

Main Menu selections	
Main Screen	Returns to the Main Screen.
Interface Menu	Allows you to specify how CHM motion is controlled and how to configure the serial port.
Configuration Menu	Allows you to set SCSI IDs, security, and other configuration options.
Tape Drive Menu	Allows you to unload, reset, open, or clean the tape drive, or display information about the tape drive.
Maintenance Menu	Allows you to perform diagnostics on the library.
Library Information Menu	Provides library status information and diagnostic information for service technicians.


Main Screen
Main Menu
Interface Menu
Control Mode Menu
LCD Interface
SCSI Interface
Sequential
9-Pin Port
Config 9-Pin Port
Baud Rate 1200
Baud Rate 2400
Baud Rate 4800
Baud Rate 9600
Baud Rate 19200
Configuration Menu
Set SCSI IDs
SCSI Parity
Sequential Options
Loop
Restart
Set next cart to 1
Adjust Contrast
Back Light
Set Date
Set Time
Set Security
Set Serial Number
210 Emulation
Chksum Labels
Tape Drive Menu
Open Tape Drive
Reset Tape Drive
Tape Drive Status
Clean Tape Drive
Maintenance Menu
Demo Menu
Slot Demo
Drive Demo
Diagnostics Menu
Self Test
Position to Elem
Park
Move Cartridge
Scan
Scan w/Range
Home CHM
Cycle Pick/Place
Cycle Gripper
Cycle S Axis
Cycle L Axis
Cycle Solenoid
Library Info Menu
SCSI Menu
SCSI Mode Params
SCSI Reservations
SCSI Sense Data
Statistics
System Sensors
Command History
Inventory Menu
Label Information
Occupied Info
Position Info

Operator keys

Use the keys on the operator panel to perform the following actions:

↑ ↓	Scrolls the screen arrow (→) up or down. The screen arrow points to the current selection.
← →	In some screens, moves the screen arrow left or right. On some menu selections, toggles an option on or off.
Help	Displays the Help screen. To exit Help, press Escape.
Escape	Returns to the previous menu or screen; cancels an operation without saving changes; or if the Main Screen is displayed, goes to the Main Menu.
Enter	Selects the item next to the screen arrow or accepts a change.
Reset	Displays the Reset screen, which allows you to reset the library. See page 54 for more information.

Operating in different control modes

"Control mode" refers to the interface used to control the motion of the CHM. Control modes are listed below:

- SCSI Interface
- Sequential
- LCD Interface
- 9-Pin Port

Each of these is described in the following pages. Refer to page 45 for instructions on changing the control mode.

Note: Control mode settings remain through power cycles.

Control mode descriptions

SCSI Interface mode

If you want the application software to control library operations, you must set the library to SCSI Interface mode. In this standard operating mode, the application software controls the motion of the CHM by issuing SCSI commands across the SCSI bus.

Note: The application software can issue commands to the library regardless of the control mode. However, the library must be in SCSI Interface mode for the application software to control CHM motion.

For detailed information about SCSI commands, refer to the *Exabyte 18D Library SCSI Reference.*

Sequential mode

If you want the library to run as a sequential stacker device, you can set the library to sequential mode. In this mode, the application software does not need to provide support for library functions, only for the tape drive. For detailed information about sequential mode, see Appendix D.

LCD Interface mode

If you want to perform operations from the operator panel that involve moving the CHM, you need to set the library to LCD Interface mode. This includes using the CHM to clean the tape drive, an option under the Tape Drive Menu. You must also be in LCD Interface mode to perform diagnostics options, which are included under the Maintenance Menu.

Note: LCD Interface mode is required only when you want to control the motions of the CHM. For example, you do not need to switch control modes to access the menus.

9-Pin Port mode

When the library is operating in 9-Pin Port mode, you can control the motions of the CHM from a remote console program connected to the library's 9-pin serial port.

Note: Use 9-Pin Port mode to control CHM motion only. You cannot access the tape drive through the 9-pin serial port.

For more information about how to use the 9-pin serial port, see page 129.

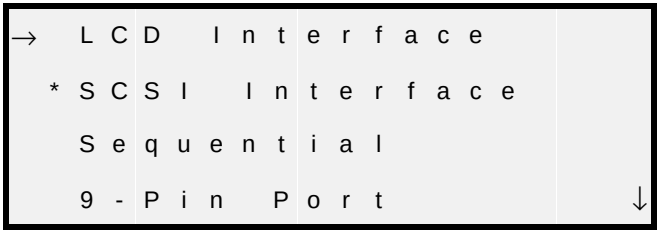
Changing the control mode

Make certain the library is in the ready state (for example, no hardware errors, the door is closed and locked, and so on).

1. If the security option has been enabled, disable it (see page 33).

2. From the Main Menu, select Interface Menu.

3. From the Interface Menu, select Control Mode Menu. The following screen appears:



4. Select the desired mode. The current control mode is indicated with an asterisk (*).

> ➤ **Important** When the library is in LCD Interface, Sequential, or 9-Pin Port mode, the software application has no control over CHM movement.

5. When the library displays a confirmation message that it has changed the control mode, press Escape to return to the Control Mode Menu.

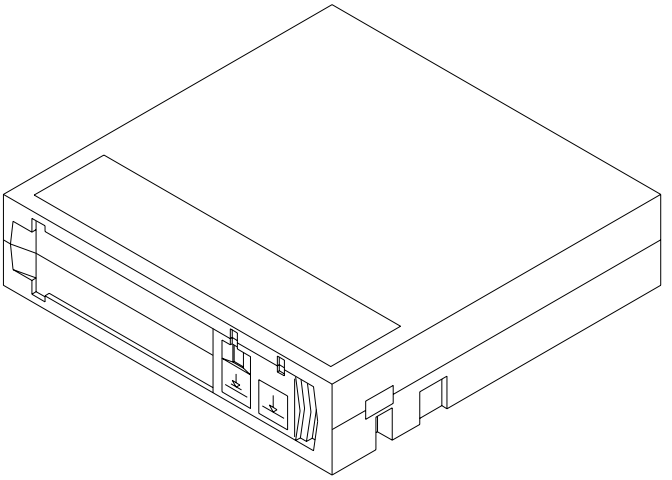
Replacing data cartridges

This section describes how to:

- Select the appropriate data cartridges for your tape drive
- Open the library door to access the cartridges
- Replace a single cartridge or a cartridge magazine
- Store cartridges outside the library

Selecting data cartridges

Exabyte recommends you use EXATAPE™IV Data Cartridges, shown below. When used in a DLT 7000, for example, a single EXATAPE IV Data Cartridge provides 35 GB native storage capacity and 70 GB with 2:1 data compression. When used in a DLT 4000, an EXATAPE IV Data Cartridge provides 20 GB native storage capacity and 40 GB with 2:1 data compression.

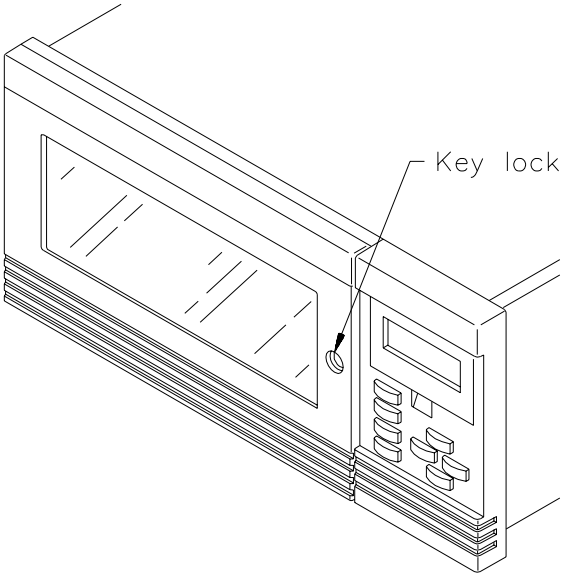


Opening the library door

To access the cartridges, you must first open the library door.

➤ **Important** During library operation, do not open the library door unless you need to remove and replace cartridges or perform a maintenance operation. After the door has been opened and then closed, your backup application may perform a time-consuming cartridge inventory process, in addition to the library's own power-on self-test.

1. Insert the key into the lock, push in, and turn it one-quarter turn to the right.



When the CHM finishes the current operation and moves to the park position, the door's interlock mechanism releases.

2. Open the door.

> **CAUTION**
>
> Do not force the door open. The door's interlock mechanism may be prevented from releasing by LCD security or by the application software.

Replacing a single cartridge

To replace a single cartridge:

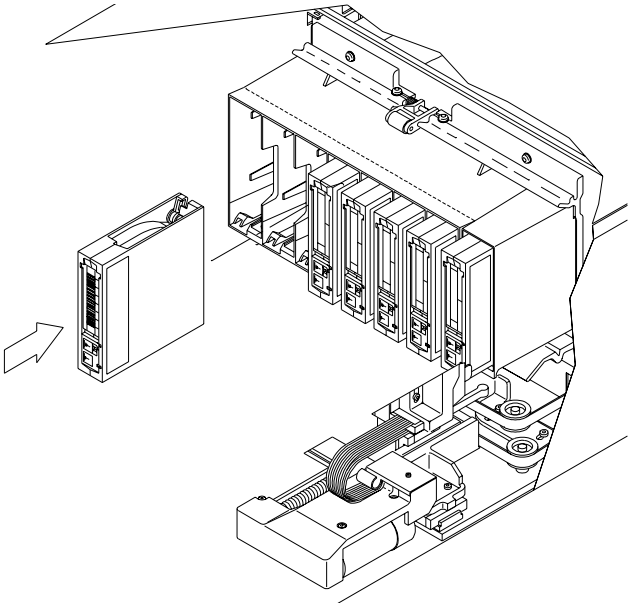
1. Remove the cartridge by pulling it straight out from its slot in the cartridge magazine.

2. Make sure that the write-protect switch on the replacement cartridge is set correctly for the desired operation. If an orange rectangle is visible, the cartridge is write-protected.

3. For rack-mount models, hold the cartridge so that the write-protect switch is down; for standalone models, hold it so the switch is to the right. Insert the cartridge into the empty slot, as shown in the following figure.

   Note: Very little force is needed to install a cartridge into the cartridge magazine. If the cartridge does not slide into place easily, check its orientation.

4. Close and lock the library's door.



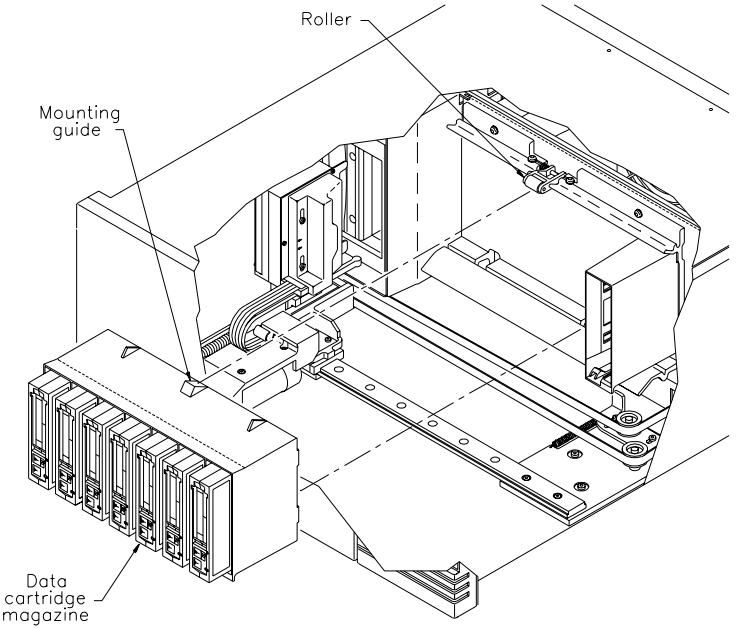
Replacing the cartridge magazine

Open the library door, as described on page 47.

1. For rack-mount models, remove the cartridge magazine by pulling it out first from under the roller at the top, then from the bottom. For standalone models, pull it out first from under the roller at the left, then from the right.

2. If desired, replace the cartridges (described on page 48).

3. Position the magazine so that the single mounting tab on the magazine is aligned with the roller on the mounting plate, as shown in the figure. For rack-mount models, clip the magazine onto the bottom and push it into place by pressing in the top. For standalone models, clip the magazine onto the right and push it into place by pressing on the left side.



4. Close and lock the door.

Storing cartridges

To maximize the shelf life of your tapes and ensure data integrity, follow these guidelines when storing cartridges:

- **Store cartridges in a suitable environment**. Follow the specifications for storage temperature and other environmental requirements, as described on the cartridge packaging. Do not allow the temperature and humidity in the storage environment to fluctuate.

- **Keep the storage location as free of airborne particulates as possible**. To eliminate obvious sources of particulates, do not permit anyone to smoke, eat, or drink near the storage area, and do not store cartridges near a copier or printer that may emit toner and paper dust.

- **Store cartridges with the write-protect switch in the protected position**.

- **Store cartridges as soon as possible** after you remove them from the library. Immediate storage helps avoid many of the conditions that can damage tapes, such as temperature and humidity fluctuation, particulate contamination, and excessive handling.

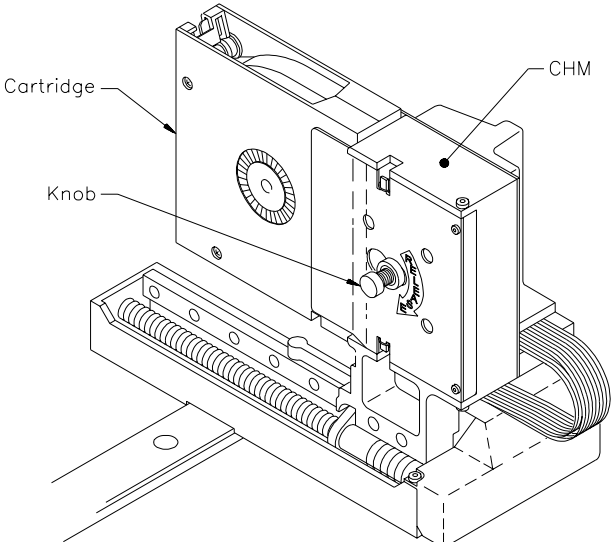
- **If possible, store each cartridge in its plastic case**. In the plastic case, the cartridge is protected from airborne contaminants by a clear plastic cover.

Removing a stuck data cartridge from the gripper

If a power outage or some other problem occurs which causes the library to shut down, you may need to manually remove a data cartridge from the gripper. To do so, follow these steps.

> **CAUTION**
>
> Do not attempt to pull the cartridge out without first loosening the gripper, as described in this procedure.

1. Make sure the library is powered off.
2. Open the library door.
3. Locate the gripper knob, shown in the following figure.



4. To open the gripper, *slightly* turn the knob clockwise (see the arrow). You should not need to turn the knob more than about a quarter turn.

> **CAUTION**
>
> If you turn the knob too far and open the gripper too wide, the motor will not be able to properly adjust the gripper's position when you power on the library. If this occurs, use the knob to close the gripper by turning it counter-clockwise. Again, do not close the gripper too far; if you do so, the motor will be unable to make the proper adjustments.

Resetting the library

If the library has encountered an error and is still not operating after you have tried the corrective action for the error, you may need to reset the library. A reset causes the library and the tape drive to perform their power-on self tests.

> **CAUTION**
>
> Before resetting the library, make sure the library or tape drive is not communicating across the SCSI bus. Resetting the library and tape drive may disrupt communications on the SCSI bus.

To reset the library, you can use one of the following methods:

- Press Reset on the operator panel, then press Enter at the confirmation screen (or press Escape to cancel).
- Perform a power-on reset by turning the library off, then back on.

  Note: The library, tape drive, or the entire SCSI bus can also be automatically reset by the host.

When the library is reset, both the library and tape drive perform power-on self-tests (POSTs).

Note: The tape drive cannot perform its POST unless the tape drive handle is closed. If, after a reset, the CHM finds a data cartridge protruding from the tape drive (that is, the tape drive handle is open), the CHM pushes the data cartridge into the tape drive and closes the tape drive handle.

If the library is performing a cartridge move operation when it is reset, it completes the move operation before it performs the power-on self-test.

When the tape drive and library have completed their POSTs, the the Main Screen appears on the LCD.

Resetting the tape drive

If the tape drive has stopped operating and does not respond to the application, select the Reset Tape Drive option from the Tape Drive Menu on the operator panel to reset the tape drive.

Notes

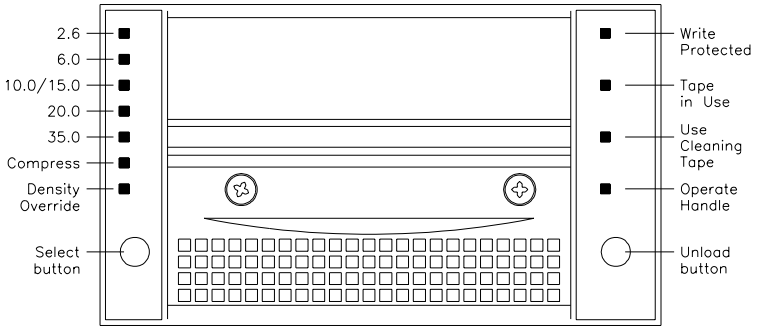
3 Tape Drive Operation

The application software automatically controls the tape drive to perform backup and restore operations. You do not need to intervene in the cartridge processing; however, you may need to perform the following tasks:

- Monitor the tape drive LEDs
- Manually unload the tape and open the tape drive handle
- Reset the tape drive
- Display information about the tape drive
- Clean the tape drive

Monitoring the tape drive LEDs

The figure below shows the front panel of the DLT 7000. The following pages provide descriptions of the indicators and controls.



The tape drive uses light emitting diodes (LEDs) to indicate operating states. Normally, you do not need to monitor the LEDs when the tape drive is installed in the library; however, basic LED states are described below for your reference.

Label	LED state	Description
2.6 6.0 10.0 20.0 35.0 (DLT 7000 only)	Yellow on	The current format (or "density") of data on this tape. For example, if the current format of this tape is 20.0, the 20.0 LED is on. If the software is changing the format of the tape during the current write session, the LED for the old format remains lit while the LED for the new format blinks (see "Yellow Blinking" below).
	Yellow blinking	If the software is writing in a data format other than the format previously used on this tape, the new format is indicated with a blinking LED. For example, if the tape was previously written in 20.0 and is currently being written in 35.0, the 20.0 LED remains lit while the 35.0 LED blinks. **Note:** The software can only change the tape format from BOT (beginning-of-tape).
Compress	Yellow on	During a read or write operation, this indicates that the data is compressed.
	Off	During a read or write operation, this indicates that the data is not compressed.

Label	LED state	Description
Density Override	Yellow on	The data is being written in the format (or "density") specified manually using the Density Select (or Select) button on the front panel. **Note:** Although you are not prohibited from doing so, using the Density Select button is not recommended for tape drives operating in a library.
	Off	The data format is selected by the application software.
Write Protected	Orange on	The tape is write-protected.
	Off	The tape is write-enabled.
Tape in Use	Yellow blinking	The tape is moving.
	Yellow on	The tape is loaded; ready for use.
Use Cleaning Tape	Yellow on	The drive head needs cleaning, or the tape is bad.
	Yellow remains on after you remove cleaning tape.	The cleaning tape may be used up. Try a new cleaning cartridge.
	After you clean the tape drive and insert the data cartridge, the yellow LED goes on again.	There may be a problem with the data cartridge. Try another cartridge. If the problem persists, contact your service provider.
	Off	Cleaning is complete, or no cleaning is required.

Label	LED state	Description
Operate Handle	Green on	It is okay to operate the tape drive handle.
	Off	Do not operate the tape drive handle.
All on left side or all on right side	Blinking	A power-on self-test (POST) or other error has occurred.
	On	POST is beginning.
	Off	POST is complete.

Using the Tape Drive Menu

The Tape Drive menu includes the following options:

- Open Tape Drive
- Reset Tape Drive
- Tape Drive Status
- Clean Tape Drive

Open Tape Drive

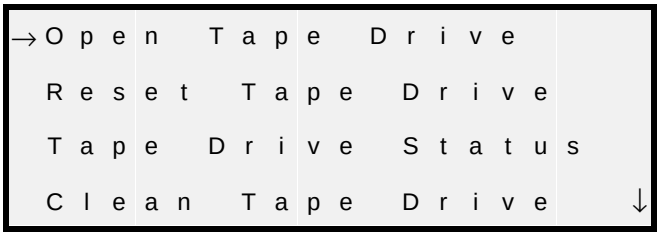
During normal library operations, the CHM automatically inserts cartridges into the tape drive and removes them, as required. If you need to manually remove a data cartridge from the tape drive, follow these instructions to unload the tape drive using the Open Tape Drive option from the operator panel.

> **CAUTION**
>
> Do not open the library door and attempt to unload the tape drive using the Unload button on the faceplate of the tape drive. Pressing the Unload button *does not* eject the data cartridge—the tape drive is still "closed."
>
> Do not attempt to open the tape drive manually by moving the handle. Manually forcing the handle to open or close the tape drive can damage the tape drive and may cause injury.

To open the tape drive from the operator panel:

1. If security has been enabled, disable it (see page 33).
2. Switch to LCD Interface mode (see page 45).

3. From the Main Menu, select Tape Drive Menu. The following screen displays:



4. Press Enter to select Open Tape Drive. When you do so, the following activities occur:

- The tape drive unloads the tape.
- When the tape is unloaded, (the Operate Handle LED will blink), the CHM opens the tape drive handle.

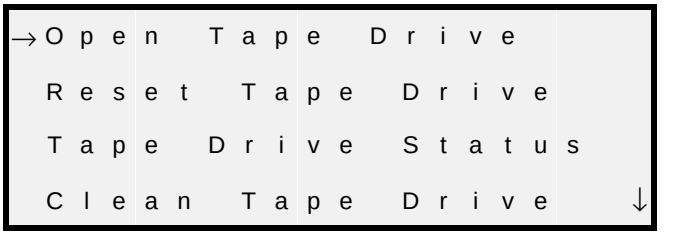
Reset Tape Drive

If the tape drive has stopped operating and does not respond to the application, select the Reset Tape Drive option from the Tape Drive Menu on the operator panel to reset the tape drive.

1. If security has been enabled, disable it (see page 33).

2. Switch to LCD Interface mode (see page 45).

3. From the Main Menu, select Tape Drive Menu. The following screen displays:



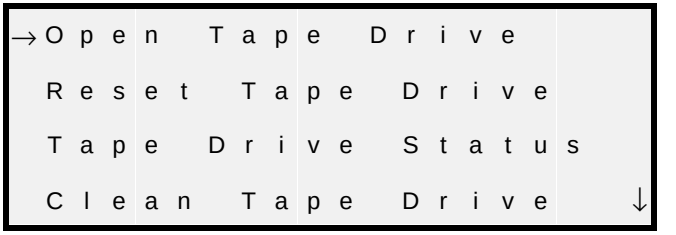
4. Press ↓ to scroll down to Reset Tape Drive and press Enter.

Tape Drive Status

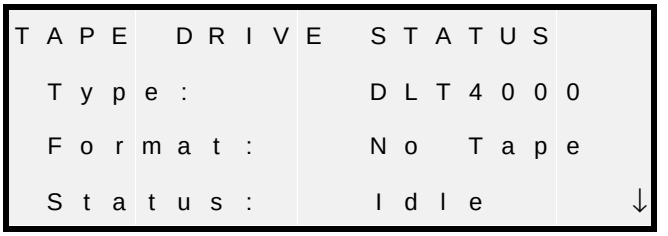
The Tape Drive Menu allows you to display information about the tape drive, including the type of tape drive installed and its operational status. The information screen is updated whenever there is a change in drive status.

To display tape drive information:

1. From the Main Menu, select Tape Drive Menu. The following screen displays:



2. Press ↓ to scroll down to Tape Drive Status and press Enter. The Tape Drive Status screen appears, similar to the following:



The following table describes the information in the Tape Drive Status screen.

Tape Drive Status screen	
Type	The type of tape drive installed.
Format	Tape Format. The formats are: ▪ No Tape ▪ Unknown (unknown format) ▪ Cleaning ▪ III/2.6 GB (2.6 GB on CompacTape III media) ▪ III/6.0 GB (6.0 GB on CompacTape III media) ▪ III/10 GB (10/20 GB on CompacTape III media) ▪ IIIXT/15 GB (15/30 GB on CompacTape IIIXT media) ▪ IV/20 GB (20/40 GB on CompacTape IV media) ▪ IV/35 GB (35/70 GB on CompacTape IV media)

Tape Drive Status screen	
Status	Tape Motion Status. One of the following: ▪ Idle ▪ Rewind ▪ Seeking ▪ Reading ▪ Writing ▪ Erasing ▪ Cleaning ▪ Loading ▪ Unload
Drive Code	Drive Microcode Revision. The tape drive's microcode revision.
Control Code	Controller Microcode Revision. The tape drive's controller microcode revision.
SCSI ID	The SCSI ID of the tape drive.
NO_ID	0 – The tape drive has a valid SCSI ID set by the library. 1 – The tape drive does not have a valid SCSI ID set by the library. The library must set the tape drive's SCSI ID before the drive is able to communicate on the SCSI bus.
IN_FLUX	0 – The status values are valid. 1 – The tape drive can not ensure that the status values are valid.
HW_ERR	0 – The tape drive is not experiencing a hardware error. 1 – The tape drive is experiencing a hardware error.
Compressed	0 – The data being written is not compressed. 1 – The data is compressed.
Clean	0 – The tape drive is clean. 1 – The tape drive needs to be cleaned.

Tape Drive Status screen	
Operate Handle	0 – Do not open or close the handle. 1 – It is okay to open or close the handle.
Present	0 – A tape drive is not installed. 1 – A tape drive is installed.
Occupied	0 – There is no cartridge loaded in the tape drive. 1 – There is currently a cartridge in the tape drive.
Occ Valid (Occupied Valid)	0 – The door has been opened or some other interruption has occurred so the occupied information may not be reliable. 1 – The occupied information is reliable.
Accessible	Indicates the accessibility of the tape drive to the CHM: 0 – A cartridge is loaded in the tape drive or the tape drive's status is unknown. 1 – A cartridge is protruding from the tape drive or the drive is empty.
Warning	Not currently used.

Clean Tape Drive

You should clean a tape drive whenever the library displays "Drive needs cleaning" on the Main Screen of the LCD, when the Use Cleaning Tape LED on the tape drive is on, or whenever your application software notifies you. (Not all software applications display cleaning requirements.)

Note: Some applications monitor the tape drive's cleaning needs and automatically insert the cleaning cartridge in the drive whenever it needs cleaning. If this is the case, you can skip the cleaning instructions in this section.

> **CAUTION**
>
> Do not use cloth swabs, cotton swabs, cleaning agents, or cleaning cartridges not approved for your tape drive.

Selecting cleaning cartridges

Use only DLT CleaningTape III. To order cleaning cartridges, see page xiii.

Cleaning the tape drive from the operator panel

To clean the tape drive from the operator panel:

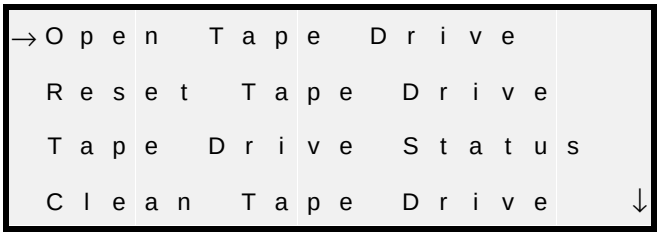
1. Make sure the tape drive needs cleaning by looking at the Use Cleaning Tape LED on the tape drive (see page 58). You can also check the Clean indicator in the Tape Drive Status screen (see page 64 for instructions).

2. Make certain a cleaning cartridge is installed in the fixed cartridge slot. (If the fixed slot contains a data cartridge and you follow these steps, you will have to unload the the data cartridge from the tape drive using the Open Tape Drive command.)

3. If security has been enabled, disable it (see page 33).

4. Switch to LCD Interface mode (see page 45).

5. From the Main Menu, select Tape Drive Menu. The following screen displays:



6. Press ↓ to scroll down to Clean Tape Drive and press Enter. When you do so, the following activities occur:

   - The CHM picks the cleaning cartridge from the fixed slot and inserts it in the tape drive.
   - The tape drive automatically performs the cleaning process and ejects the cartridge when the process is complete. This may take several minutes (longer if the cleaning cartridge has been used often).
   - The CHM automatically picks the cartridge from the tape drive and replaces it in the fixed cartridge slot.

7. Confirm that the cleaning was done by looking at the LED on the front of the tape drive. The Use Cleaning Tape LED should be off. If the LED is still on, replace the cleaning cartridge and clean the tape drive again.

8. When the cleaning is complete, return the library to its original control mode (SCSI Interface mode or sequential mode) and re-enable security, if appropriate.

   Note: If the Use Cleaning Tape LED comes on again after you insert a data cartridge in the tape drive, try cleaning the tape drive again. If the LED comes on again, contact your service provider.

Notes

4 Maintenance

This chapter describes the following:

- Cleaning requirements for the library
- Using touch-up paint on the housing
- Replacing the fuse
- Replacing the air filter
- Replacing the tape drive

CAUTION

Unless you have a self-maintenance contract with Exabyte, do not attempt to replace any components in the library, other than the tape drive, fuse, and air filter. If you do so, you will void your warranty.

Cleaning requirements

The only library components that should be cleaned are the tape drive and the window in the door. Instructions for cleaning the tape drive are provided on page 67.

CAUTION

The library's internal components are lubricated at the factory and should not be cleaned or relubricated.

To protect the internal components from dust, keep the library door closed and locked.

Cleaning the library window

To clean the library's window, use the cleaning packets provided with the library. (To order additional cleaning packets, see page xiii.)

CAUTION

To avoid scratching the window, do not use abrasive cleaners, abrasive cleaning implements, harsh chemicals, or solvents.

Using touch-up paint on the housing

For standalone models, a pearl-white paint kit is available for touching up nicks and scratches on the finish. For ordering information, see page xiii.

Replacing the fuse

The library uses a 2.5 amp, 250-volt fuse, which is located in the fuse drawer at the back of the library next to the power cord connector. An extra fuse is provided in the fuse drawer. To order additional fuses, see page xiii.

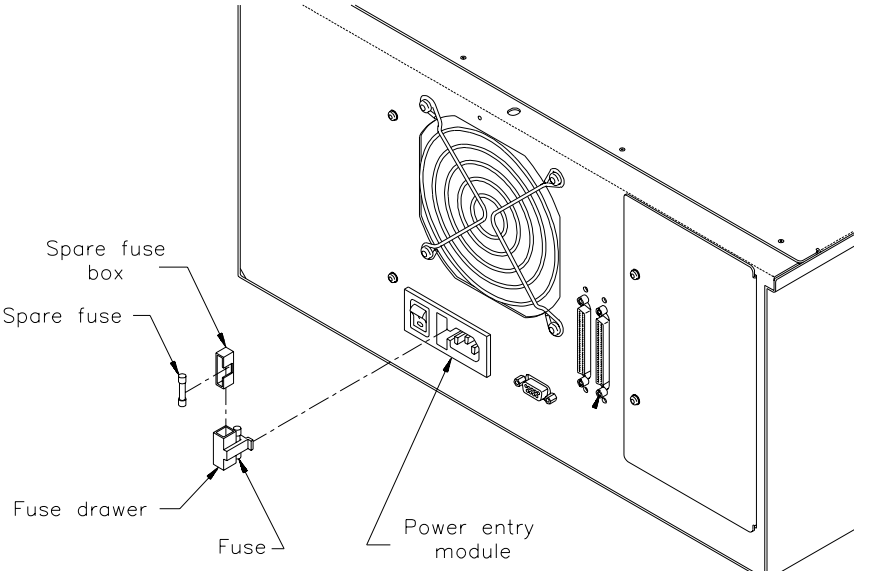
> **CAUTION**
>
> When replacing the library's fuse, use only the same type and rating of fuse.

To replace the library's fuse:

1. Turn off the library and remove the power cord.

> **WARNING!**
>
> Before performing any of the following steps, be sure that the power switch is off and the power cord is disconnected from the library.

2. Place a small screwdriver underneath the tab on the fuse drawer. Gently lift out the fuse drawer.



3. Pull the blown fuse out of the fuse slot.

4. Use the screwdriver to push the spare fuse box out of the fuse drawer. Remove the spare fuse and place it in the fuse slot.

5. Insert the fuse drawer into the back panel. Push in until you hear it snap into place.

6. If desired, order another spare fuse for the fuse drawer.

Replacing the air filter

The library includes an air filter, located behind the door. The air filter should be replaced once a year (or more frequently if the library is operating in a dirty environment). To order replacement filters, see page xiii.

To replace the air filter:

1. Unlock and open the library's door (see page 47).

2. From inside the door, use a T-15 TORX bit to remove the three screws that secure the metal filter cover to the front door, as shown in the figures on the next page.

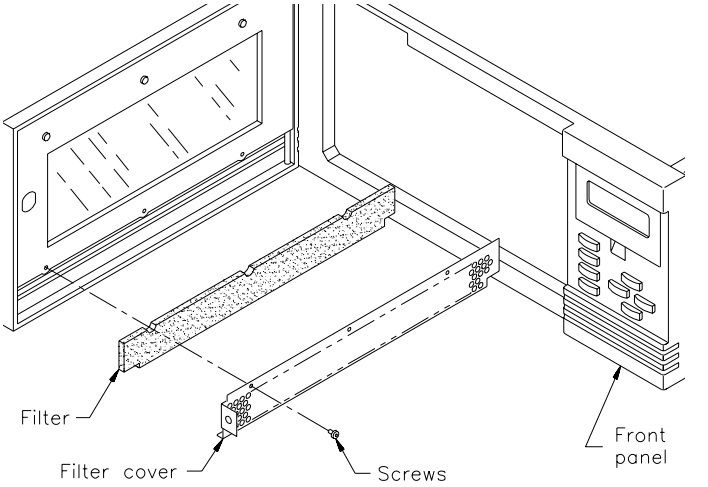
3. Remove the metal filter cover and pull out the filter.

Note: The rack-mount model contains one long filter; the standalone contains two smaller filters.

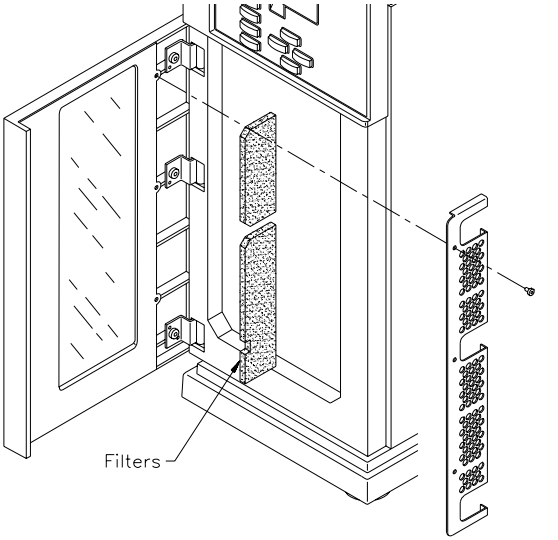
4. Replace the new filter inside the door.

5. Position the metal cover over the filter. Using a T-15 TORX bit, replace the three screws that secure the metal cover inside the front panel.

Rack-mount model:



Standalone model:



Replacing a tape drive

The library operates with a Quantum DLT tape drive supplied by Exabyte. When you order a new tape drive for the library, you must order it through Exabyte or an approved Exabyte supplier. The tape drive must be specially equipped for library operation and must include Exabyte mounting rails. You cannot install a generic Quantum DLT tape drive into the library.

> **CAUTION**
>
> Make sure you replace the tape drive with the same model. Changing tape drive models requires an upgrade kit, if available.

Replacing a tape drive involves the following steps:

✔	Step	Description
	1	Prepare for the replacement procedure.
	2	Remove the tape drive.
	3	Install the tape drive.
	4	Resume library operations.

Step 1 – Prepare for replacement

1. Obtain a # 15 TORX screwdriver and a flat-blade screwdriver.

2. Ensure that the environment is free of conditions that could cause electrostatic discharge (ESD). If possible, use an antistatic mat and grounded static protection wristband during installation. If a mat and wristband are not available, touch a known grounded surface, such as the computer's metal chassis.

3. Turn the library's power switch to off.

4. Disconnect the power cord.

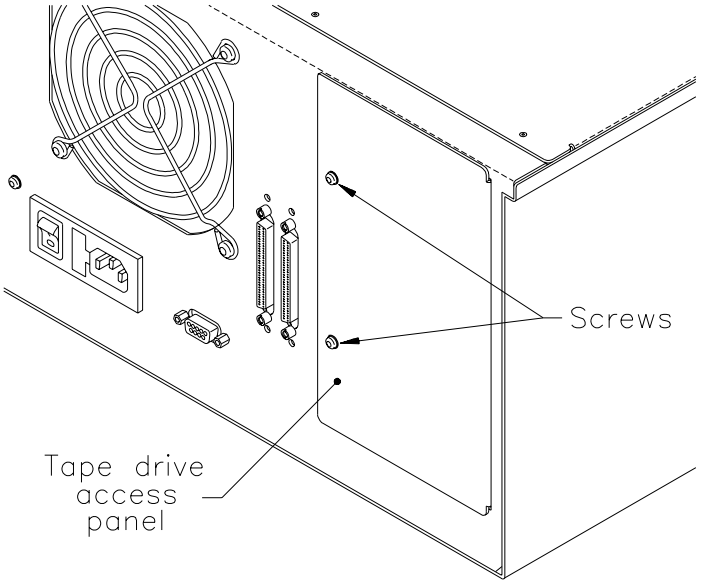
WARNING!

Before performing any of the following steps, be sure that the power switch is off and the power cord is disconnected from the library.

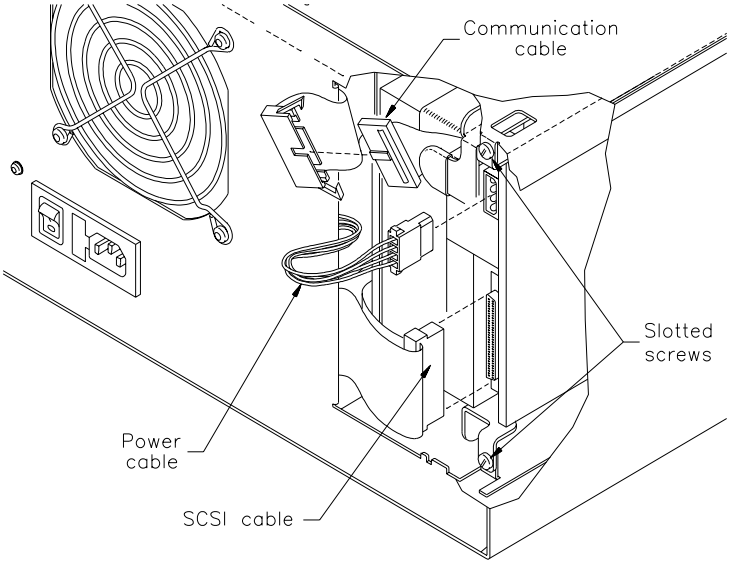
Step 2 – Remove the tape drive

To remove the tape drive:

1. From the back panel, use the T-15 TORX screwdriver to remove the two screws that secure the tape drive access panel to the library. Remove the access panel.



2. Unplug the power cable that plugs into the back of the tape drive.



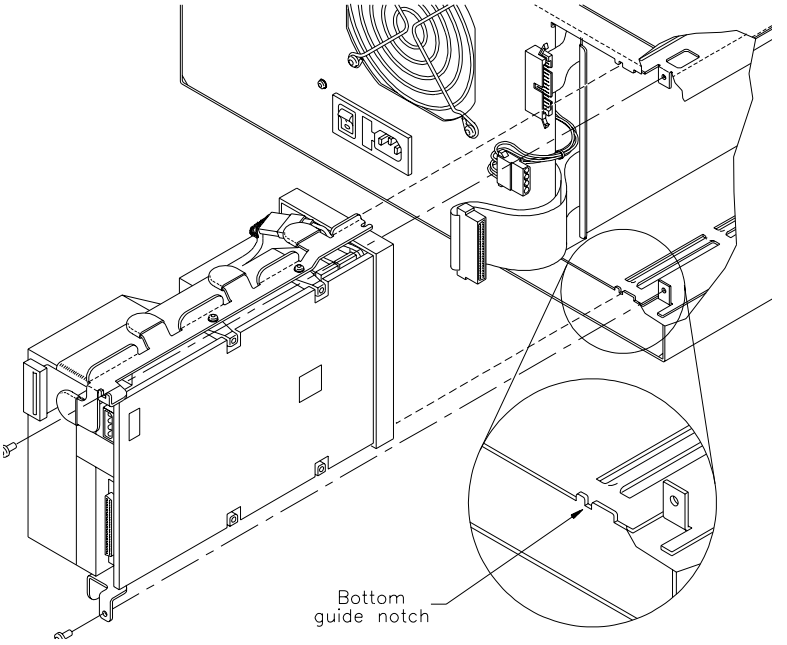
3. Unplug the SCSI cable.

4. Unplug the communication cable.

5. Using the flatblade screwdriver, remove the two screws that secure the tape drive rails to the library rails.

6. Use one hand to hold the cabling out of the way; use the other hand to take hold of the tape drive rails and pull the tape drive out of the slot.

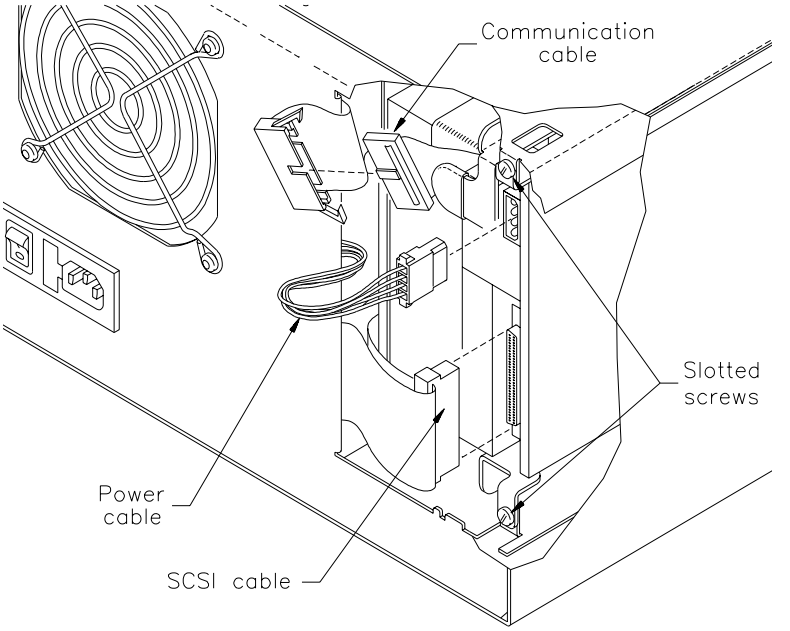
> **CAUTION**
>
> Make sure you do not damage the cabling when you remove the tape drive.



Step 3 – Install the tape drive

1. Align the tape drive rails with the bottom and top guide notches on the library (see figure above).

2. Using one hand to hold the cabling out of the way, slide the tape drive into the slot. Keep pushing until the tape drive rail hits the stop on the library rail, and the tape drive clicks into place.



3. Reconnect the communication cable, the SCSI cable, and power cable as shown in the above figure.

4. Using a flatblade screwdriver, replace the two screws that secure the tape drive rails to the library rails.

5. Replace the tape drive access panel and use the T-15 TORX screwdriver to replace the two screws.

Step 4 – Resume operations

1. Reconnect the power cord.

> **CAUTION**
>
> To avoid damaging the tape drive, make sure the library is powered off when you connect it to the SCSI bus.

2. Close and lock the library's door.

3. Turn on the library. The library will take approximately one minute to complete its power-on self-test.

Note: When you replace a tape drive, the new drive automatically assumes the SCSI ID of the old tape drive. If you want to view or change the SCSI ID of the new tape drive, see page 29.

Notes

5 Shipping the Library

This chapter describes procedures for:

- Returning the library for service
- Packing the library

Returning the library for service

If you need to return the library to the factory for service, contact your service provider. If your service provider instructs you to return the library directly to Exabyte, contact Exabyte Service to obtain a Return Materials Authorization (RMA) number and the shipping address (see page xiii). When you have the RMA number, follow the packing instructions on the following pages.

Packing the library

Use the original packing materials to pack the library (shipping containers, foam packing pieces, and antistatic bag). You will also need packing tape and banding material.

> **CAUTION**
>
> To avoid damaging the library and voiding your warranty, be sure to use the original shipping materials (or replacement materials obtained from your vendor) when repacking and shipping the library. Do not use the shipping carton and packing materials to ship items other than a library.

Preparing the library for shipping

To prepare the library for shipping:

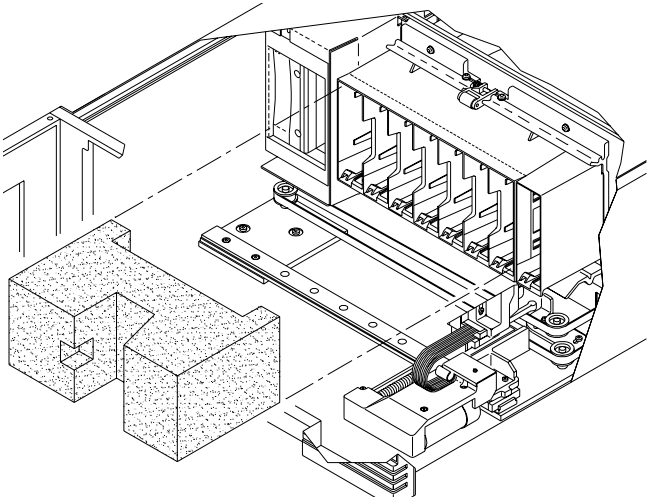
1. Remove all cartridges from the magazine. Make certain the CHM gripper and the tape drive do not contain cartridges. To remove a data cartridge from the gripper, follow the instructions on page 52. To remove a data cartridge from the tape drive, follow the instructions on page 62. Do not remove the magazine.

2. Power off the library.

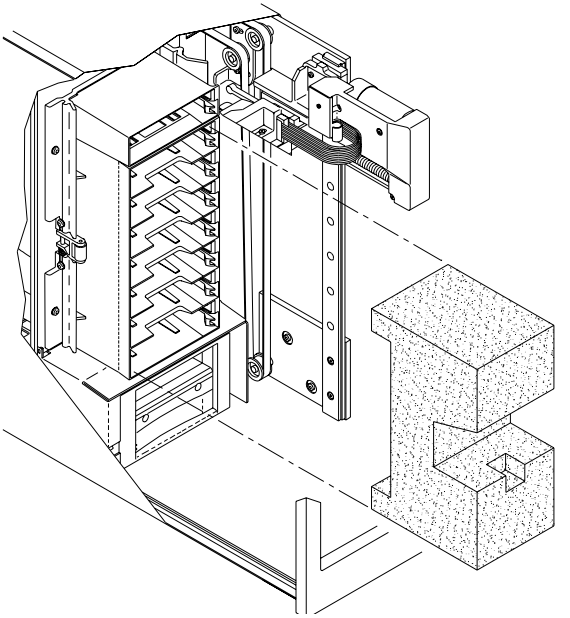
3. Remove the keys, power cord, the SCSI cables and any terminator. Do not ship these items if you are returning the library to the factory.

4. Insert the small foam packing piece in the cartridge magazine, as shown in the figures.

Rack-mount model:

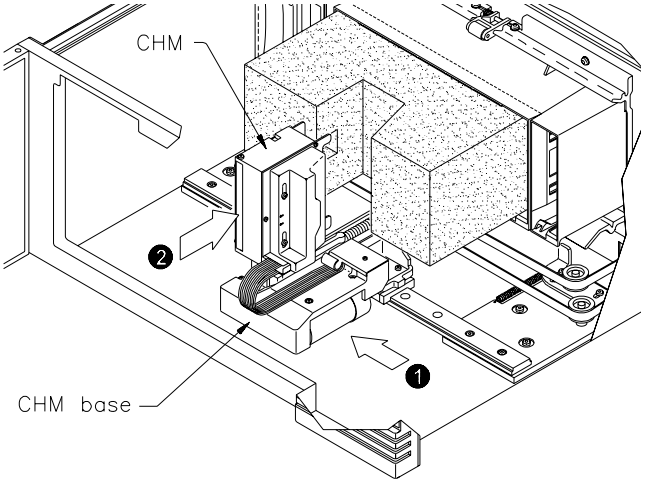


Standalone model:

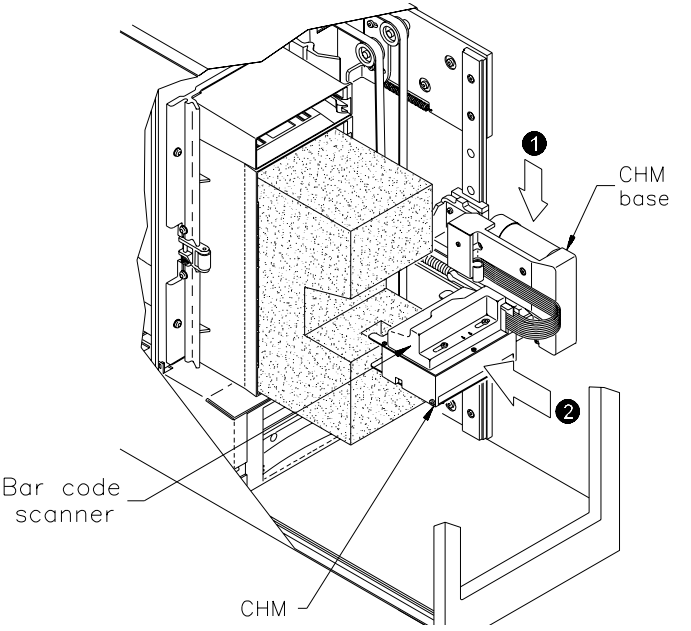


5. Move the CHM (❶) so that it is centered in front of the foam packing piece. Push the upper portion of the CHM forward (❷) until it is secure between the sides of the foam.

Rack-mount model:

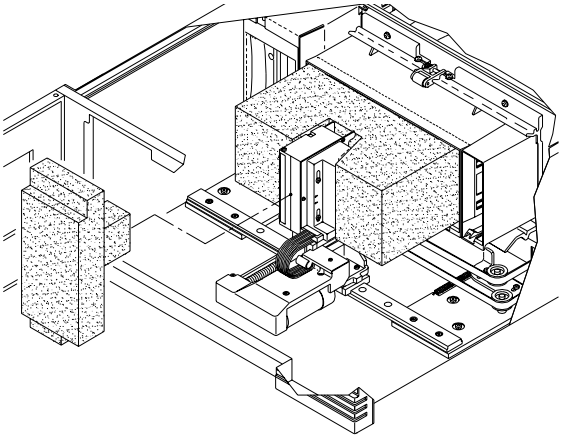


Standalone model:

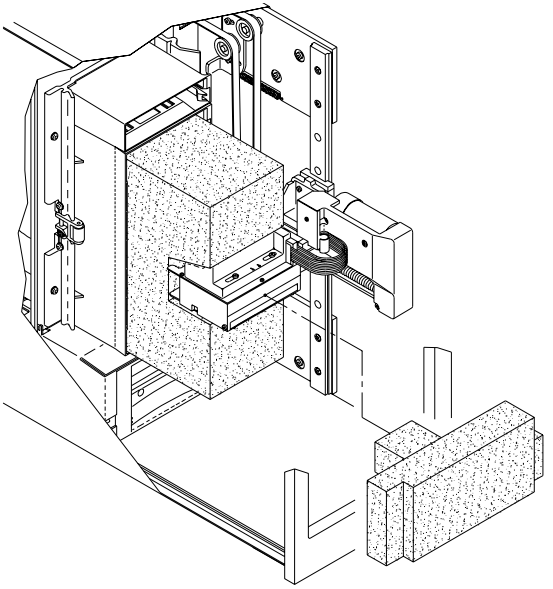


6. Insert the large foam packing piece between the CHM and the door opening, as shown below. Make certain the foam is flush against the upper base of the CHM.

Rack-mount model:



Standalone model:



7. Close and lock the library door. Remove the key.

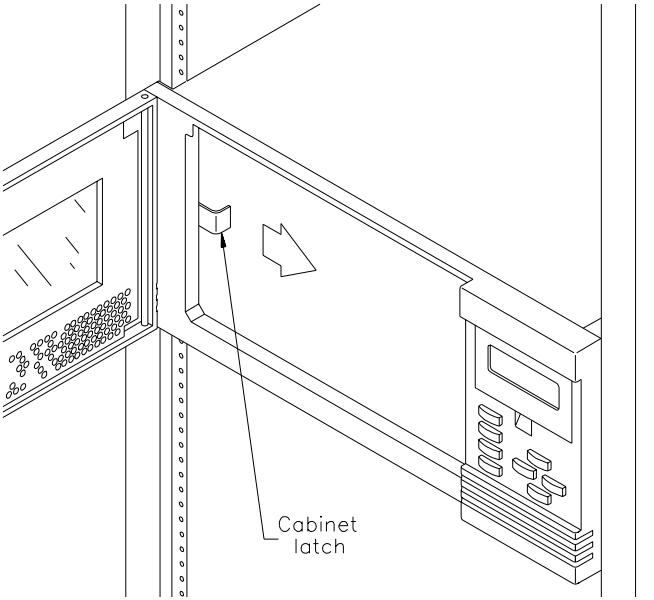
Removing the rack-mount model from the rack

WARNING!

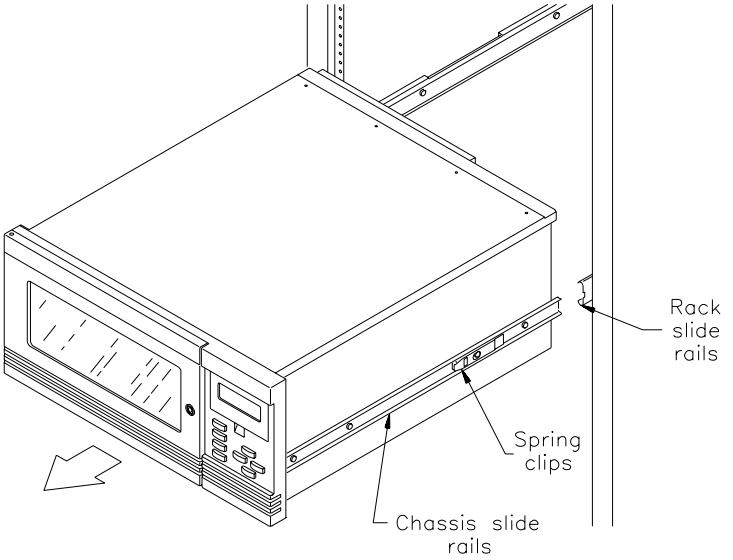
The rack-mount library weighs 63 pounds (29 kg). At least 2 people are needed to move or lift the library. Most of the weight is toward the back of the library.

To remove the rack-mount library from the rack:

1. Locate the cabinet latch, as shown in the figure below. Pull on the latch.



2. Slide the library forward until the rails stop at their spring clips. Using two people, press the spring clips to disengage the rails and lift the library out of the rack.



3. If you are shipping the slide rails with the library, use a T-20 TORX driver to remove the four screws that attach each rack slide rail to the front and rear of the cabinet. (See the figure on page 8.)

Note: If clips nuts are attached to the rack, remove them.

4. Attach the two rack slide rails to the sides of the library.

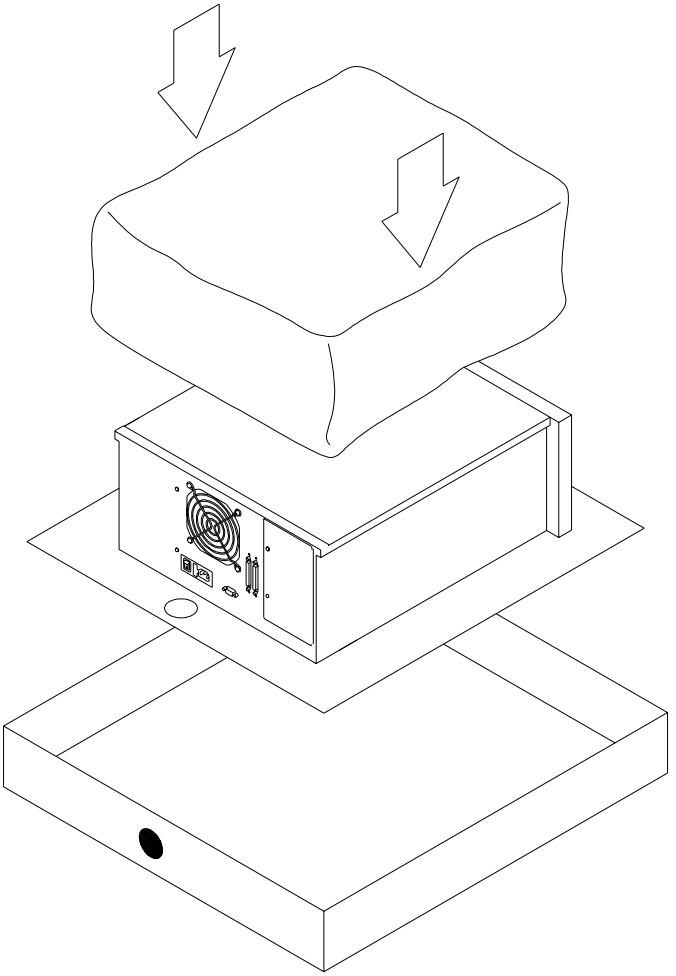
Packing the library

WARNING!

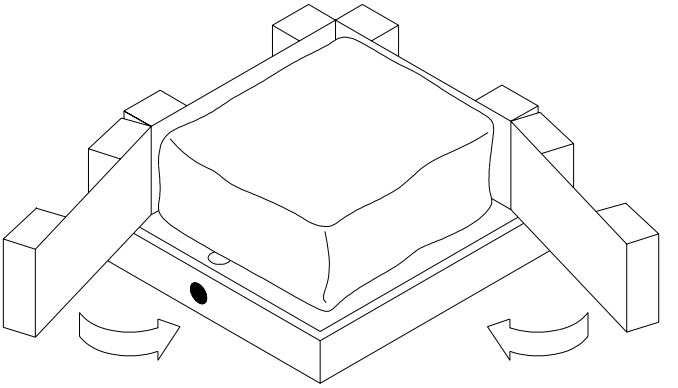
Including the data cartridge magazine, the rack-mount library weighs 78.7 pounds (85.7 kg); the standalone library weighs 106.7 pounds (48.4 kg). At least 2 people are needed to move or lift the library. Most of the weight is toward the back of the library.

Refer to the figure on the next page and pack the library as follows:

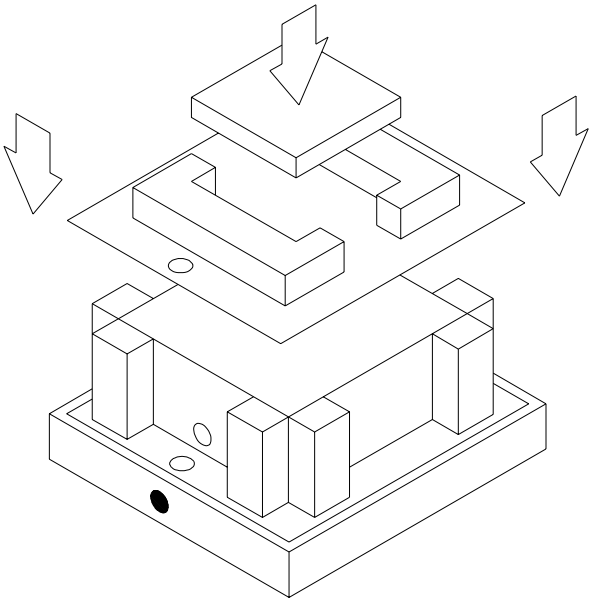
1. Place the library on top of the bottom cushion, then place the antistatic bag over the library, as shown in the figure on the next page. For the standalone model, place the library on its side (CHM base down).



2. Place the cushioned packaging around the library, as shown below. (Use the alignment holes in the packing pieces as a guide.)



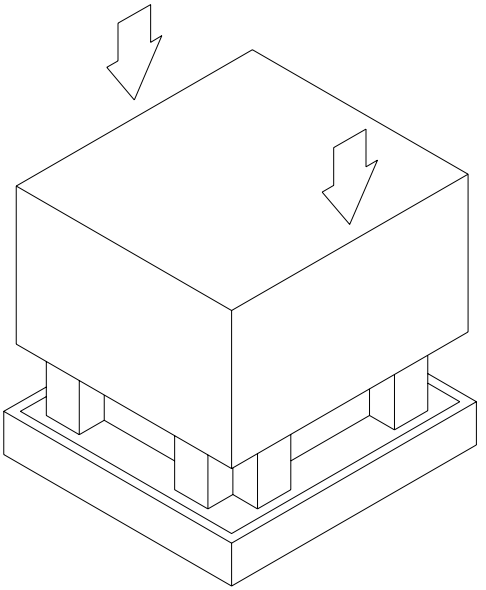
3. Place the cushioned top over the library. (Use the alignment holes in the packing pieces as a guide.)



4. If you are shipping accessories with the library, place the accessory box between the two top packing cushions.

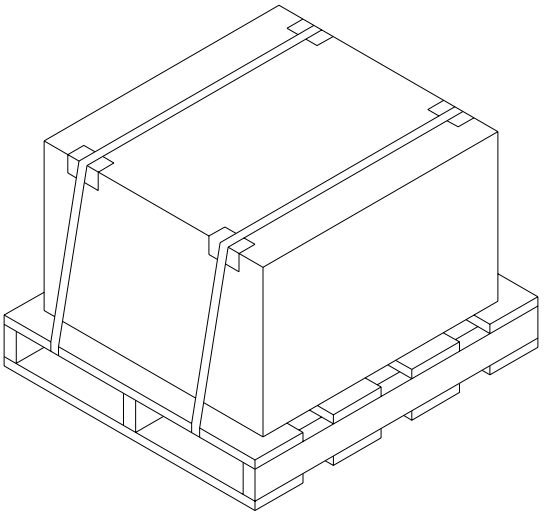
5. Lay the necessary paperwork in the top of the library box.

6. Place the carton over the library, as shown in the figure, and tape the box shut.



7. Place the shipping label on the box.

8. Place the library on the wooden pallet. Secure banding material around the box and through the wooden pallet.



6 Advanced Operation

This chapter describes advanced operations you can perform from the operator panel:

- Viewing library information, which includes SCSI data, hardware operating statistics and status, command history, and cartridge inventory
- Performing diagnostics on the library
- Configuring the serial port for diagnostics

Many of the tasks described in this chapter may be necessary if you want to troubleshoot library hardware operations.

Using elements

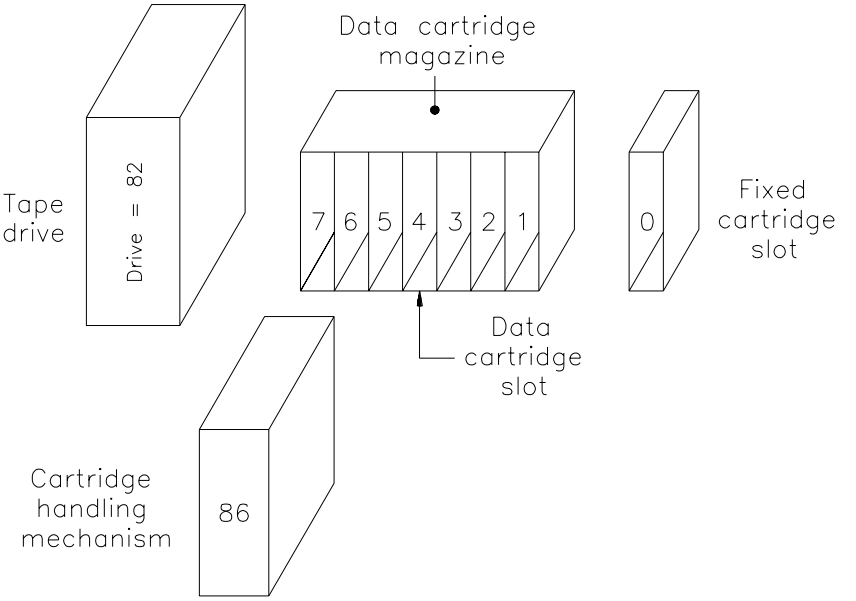
Elements are the physical locations in the library that can accept a cartridge (the CHM, the magazine slots, the fixed slot, and the tape drive).

Element indexes

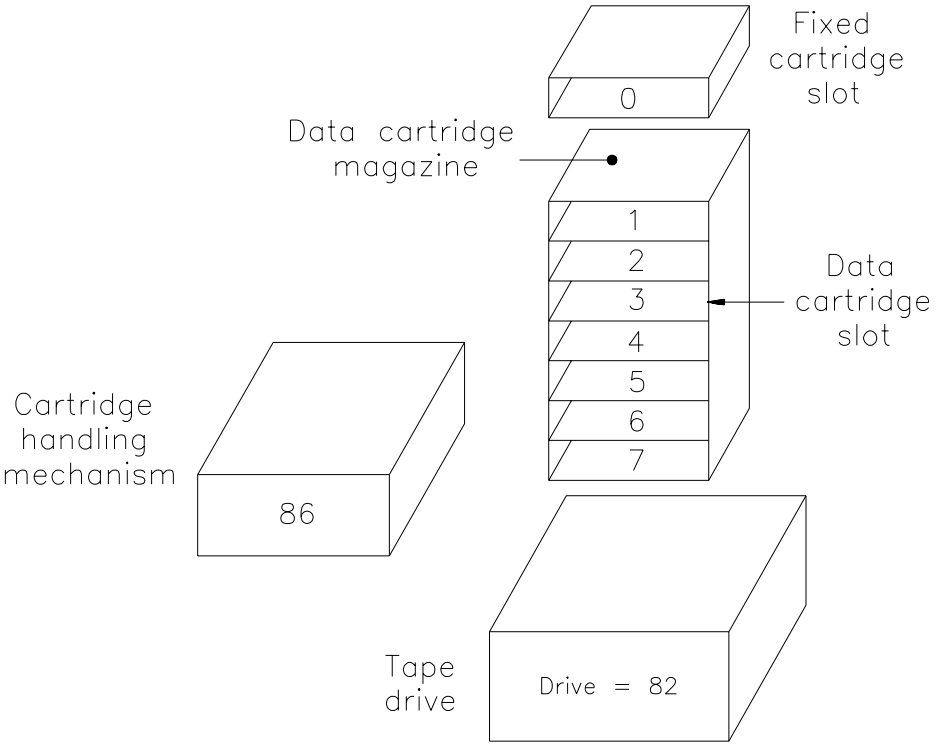
Each element has an *element index*, which enables the library to identify the elements. Many operator panel functions require you to use element indexes. For example, to move a cartridge using the Diagnostics Menu, you must specify the source and destination element indexes. The *source* is either a cartridge slot or the tape drive where the CHM will pick a cartridge. The *destination* is either the slot or the tape drive where the CHM will place the cartridge.

The following diagrams show the element indexes assigned for the library.

Indexes for the rack-mount model:



Indexes for the standalone model:



Element addresses

Your application software may use *element addresses* to identify elements in the library. The difference between an element index and an element address is that an index is a fixed number set by the library, whereas an address can be changed by your application software (using the SCSI command, MODE SELECT).

The element indexes correspond to the library's default element addresses. To verify the current element addresses, display the SCSI Mode Parameters screen (see page 101).

Viewing library information

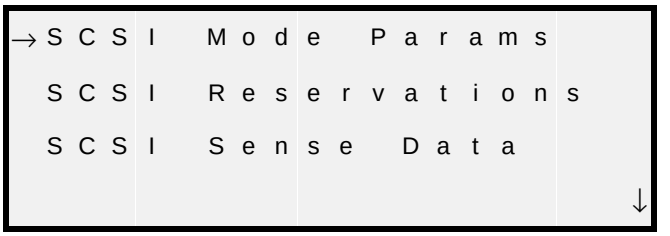
The functions in the Library Information Menu are mainly for use by technical support and application developers. If you are an end-user, you may be asked by technical support to display one of these screens and locate information that will help troubleshoot a problem.

This section describes the following library information:

- **SCSI Menu**. Contains SCSI mode parameters, reservations, and sense data.
- **Statistics.** Contains data about CHM operations and elements.
- **System sensors.** Contains information about the library's mechanical sensors.
- **Command history.** Displays the contents of the history buffer.
- **Inventory Menu.** Contains information about bar code labels and elements.

Viewing SCSI data

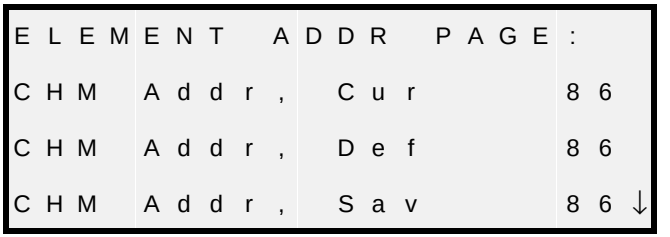
SCSI information is available through the SCSI Menu. To display this menu, select Library Info Menu from the Main Menu, then select SCSI Menu. The following menu appears:



SCSI Mode parameters

The SCSI Mode Parameters screen displays the settings of various operating mode parameters. These parameters are equivalent to the parameters reported by the library in response to a MODE SENSE command, issued by the application software. Typically, the values of these parameters are changed by a MODE SELECT command. For more information about the MODE SENSE and MODE SELECT commands, refer to the *Exabyte 18D Library SCSI Reference*.

To view these parameters, select SCSI Mode Params from the SCSI Menu. The following screen appears:



For each parameter, the SCSI Mode Parameters screen shows the current (Cur), default (Def), and saved (Sav) values:

- The *current* value is the value currently active. It is either the power-on default or a temporary value set by the latest MODE SELECT command.
- The *default* value is the original value set at the factory.
- The *saved* value is the value specified as the power-on default by a MODE SELECT command. After a saved value has been specified with a MODE SELECT command, this value takes effect immediately and each time you power on the library.

The table below describes the items on the SCSI Mode Parameters screen:

SCSI Mode parameters:	
CHM Addr*	The element address of the cartridge handling mechanism (CHM).
Stor Addr	The element address of the first storage location, which is the fixed cartridge slot. See page 98 for a complete numbering scheme.
Drive Addr	The element address of the tape drive.
Drive Num	The number of tape drives installed. (Must be 0 or 1).
Parity	Whether SCSI parity checking is enabled for the library. When the parity option is on, the library checks all data coming across the SCSI bus for parity.
Pty Retry	The number of times the library will retry a SCSI phase after detecting a parity error.
Security	Whether security has been enabled by SCSI or not. (Security also can be enabled from the operator panel; see page 32 for more information.)

SCSI Mode parameters:	
Keypad	Whether keypad passthrough mode is enabled or not. The software application can use this mode to control the library when you press a key on the library's operator panel.
Wr Line 1 *through* Wr Line 4	Whether the text displayed on each of the four lines on the Main Screen is defined using the SCSI MODE SELECT command.

* When set to their default values, the element addresses reported on this screen are the same as element indexes shown on page 98. However, unlike element indexes, which cannot be changed, addresses can be changed with a MODE SELECT command.

SCSI reservations

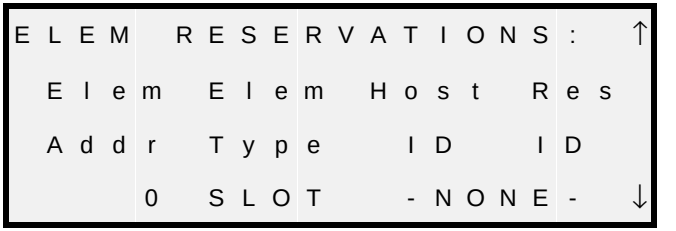
The SCSI Reservations screen indicates if the library or its elements are reserved for exclusive use by a host computer. The library and its elements are reserved and released through SCSI commands (RESERVE and RELEASE).

You may want to view SCSI reservations if you are operating the library in a multi-host environment and you want to determine which elements are reserved by which host. Multiple hosts can reserve different elements within a single library. For example, Host 1 may reserve cartridge slots 1 through 3 for its exclusive use, while Host 2 may reserve slots 4 through 7.

To view SCSI reservations:

1. Select SCSI Reservations from the SCSI Menu. The first screen to appear is the Unit Reservation screen:

2. To display the Element Reservations screen, press ↓ to scroll past the Unit Reservation screen.



3. To view other elements, press ↑ and ↓. To return to the SCSI Menu, press Escape.

The information in the SCSI Reservations screen is described in the following table.

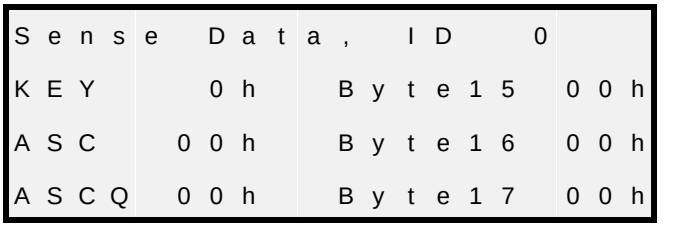
Unit reservations:	
Unit Reservation	The library's reservation status (1 if it is reserved or 0 if it is not) and the host's SCSI ID, if the library is reserved.
Elem reservations:	
Elem Addr	The address of the element.
Elem Type	The category of elements. There are three categories: CHM, Drive, and Slot.
Host ID	The SCSI ID of the host that currently has the element reserved.
Res ID	The ID that the element is reserved under. This is a number assigned to the element by a host when the reservation was made. If there is no reservation, the Res ID and Host ID columns display "-NONE-".

SCSI sense data

When an error or change of state occurs, the application software can issue a SCSI REQUEST SENSE command to the library to obtain information. Some of this information, called *sense data*, is displayed on the SCSI Sense Data screen. Sense data provides information to help you diagnose problems with the library. For more detailed information about SCSI sense data, refer to the *Exabyte 18D Library SCSI Reference*.

To view the sense data:

1. Select SCSI Sense Data from the SCSI Menu. The following screen appears:



   The ID at the top of the display is the SCSI ID of the host that the sense data is being held for. (Note that sense data is supplied for inactive IDs as well as active IDs.)

2. To view other devices, press ↑ and ↓. To return to the SCSI Menu, press Escape.

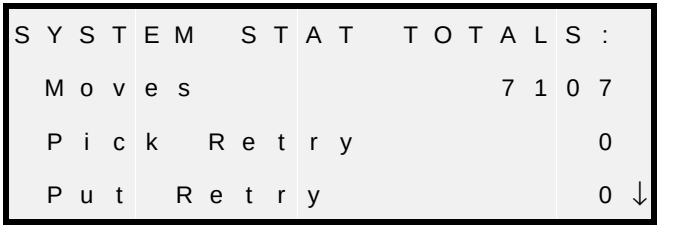
The following table describes the information in the Sense Data screen.

Sense data:	
KEY	This is the sense key returned by the REQUEST SENSE command. The sense keys are: **0h–No Sense** There is no specific sense key information to report. **2h–Not Ready** The library is not ready to perform motion commands. **4h–Hardware Error** The library detected a hardware failure during a self-test or while performing a command. Operator intervention may be required. **5h–Illegal Request** There was an illegal parameter in the command descriptor block or in the additional parameters supplied as data for a command, or the library is in the wrong mode to execute the command. **6h–Unit Attention** The cartridge inventory may have been violated. **Bh–Aborted Command** The library aborted the command. The initiator may be able to recover by trying the command again.
ASC	This is the Additional Sense Code, which, along with the Additional Sense Code Qualifier, provides information describing a specific error condition.
ASCQ	This is the Additional Sense Code Qualifier, which, along with the Additional Sense Code, provides information describing a specific error condition.
Byte 15	This is the Sense Key Specific data, which provides additional information about an error condition. This information is valid only for the Illegal Request (5h) sense key.
Byte 16	This is the first byte of the Field Pointer data. It indicates which byte in the command had an error. This information is valid only for the Illegal Request (5h) sense key.
Byte 17	This is the second byte of the Field Pointer data. This information is valid only for the Illegal Request (5h) sense key.

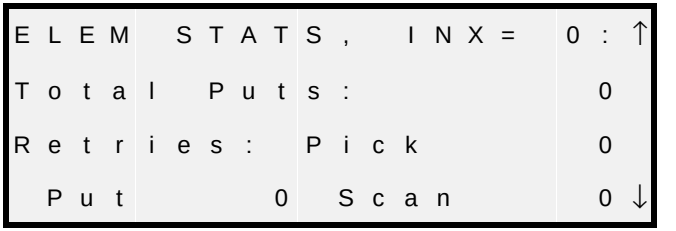
Viewing statistics

The Statistics Menu contains two selections: one for reviewing information about CHM movements and one for reviewing information about elements. To view statistics:

1. Select Library Info Menu from the Main Menu, then select Statistics. The first screen to appear is the System Stat Totals screen:



2. To display the Element Stats screen, press ↓ to scroll past the last item in the System Stat screen.



The following table describes the information in the Statistics screen.

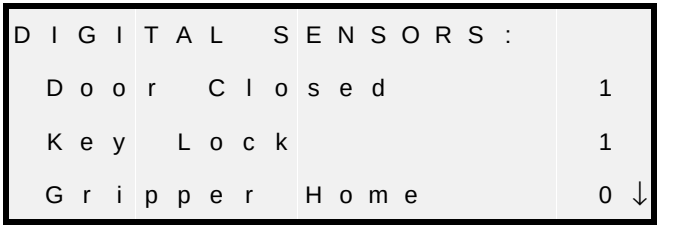
System statistics:	
Moves	The number of times the CHM has picked a cartridge and placed it in a slot or tape drive.
Pick Retry	The number of times the CHM retried picking a cartridge.
Put Retry	The number of times the CHM retried placing a cartridge.
Scans*	The number of times the library scanned a bar code label.
Scan Retry*	The number of times the library retried scanning a bar code label.
Scan Fail*	The number of times the library failed to scan a bar code. The library tries to scan a bar code several times before it logs a failure.
Element statistics:	
Total Puts	The number of times a cartridge was placed in that element since the library was turned on.
Retries: Pick	The number of times the library retried picking a cartridge from that element.
Retries: Put	The number of times the library retried placing a cartridge in that element.
Retries: Scan*	The number of times the library retried scanning that element.

* If your library does not include a bar code scanner, these fields always display zero.

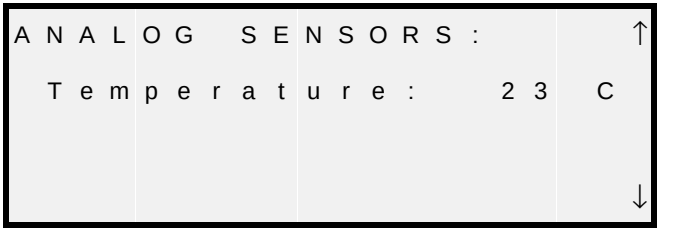
Viewing system sensors

The System Sensors screens enable you to troubleshoot hardware problems by checking the current status of the library's internal mechanical sensors. To view system sensors:

1. Select Library Info Menu from the Main Menu, then select System Sensors. The Digital Sensors screen is the first to appear:



2. To display the Analog Sensor screen, press ↓ to scroll past the last item on the Digital Sensors screen.



The following table describes the information in the System Sensors screens.

Digital system sensors:	
Door Closed	Indicates whether the front door is closed (1) or open (0).
Key lock	Indicates whether the front door is locked (1) or unlocked (0).
Gripper Home	Indicates whether the gripper is located in its home position (1) or not (0). The gripper is in its home position when the gripper fingers are open.
Cart Seated	Indicates whether the cartridge is seated in the CHM (1) or not (0).
Drive Door	Indicates whether the drive door handle is open (1) or closed (0).
Analog system sensors:	
Tem-perature	Indicates the temperature of the library in degrees Celsius.

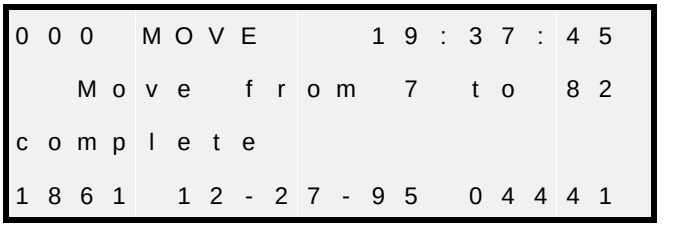
Viewing the command history

The Command History screen creates a display of the most recent 300 events that have occurred in the library. If you contact technical support personnel, a technician may ask you to scroll through this buffer looking for particular events.

To display the command history:

1. From the Main Menu, select Library Info Menu.

2. From the Library Info Menu, select Command History. The system displays a screen similar to the following:



3. Scroll through the buffer by pressing ↓ and ↑.

4. To exit the command history screen, press Escape

The following table briefly describes the Command History screen. For complete details, refer to History Buffer Display in *Exabyte 18D Maintenance*.

Shown in sample	Field name	Description
000	IDX (Index)	The line number of this event within the Command History. The range is 000 (the most recent event) through 299. The most recent event is displayed first.
MOVE	From	The process that logged this event.
19:37:45	Time	The time, according to the library's internal clock, that the event took place.
Move from 7 to 82 complete	Description	Description of the event.
1861	Line	The line number of the source code that logged this event.
12-27-95	Date	The date, according to the library's internal calendar, that the event took place.
04441	Seq	The sequence number of this event across all system buffers.

Viewing inventory information

The library stores inventory information in nonvolatile memory and uses the information to process SCSI commands from the application software. The inventory contains information about the following element locations:

- CHM
- Cartridge slots
- Tape drive

The Inventory Menu allows you to display the following information:

- **Bar Code Label information.** This includes data about whether the bar code scanner could accurately scan the label.

- **Element occupied information.** This includes data about whether the element contains a cartridge and whether a magazine or tape drive is installed.

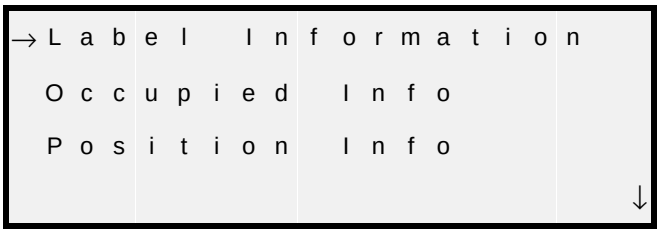
- **Element position information.** This includes data about the exact position of each element.

Bar code label information

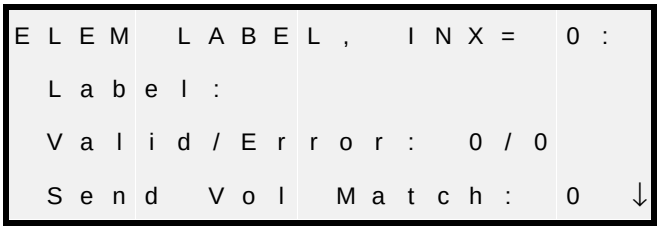
If your library is equipped with a bar code scanner, you can view information about the bar code labels attached to your cartridges. To display bar code label information:

1. From the Main Menu, select Library Info Menu.

2. From the Library Info Menu, select Inventory Menu. The following menu appears:



3. From the Inventory Menu, select Label Information. The following screen appears:



4. Press ↓ to view a higher element index; press ↑ to view a lower element index.

The following table describes the fields on the Element Label screen.

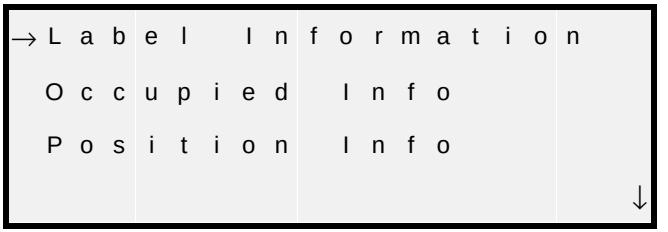
Element label:	
INX	Displays the element index for which information is being displayed.
Label	If the element location contains a cartridge whose bar code label has been scanned, the Label field contains the cartridge label. (If the library is not equipped with a bar code scanner, this field is blank.) **Note:** If the value displayed for the Label field does not match the text on the bar code label (extra or missing characters), the Chksum Labels option may be set incorrectly (see page 35).
Valid	Indicates whether the Label field is valid, as follows: 0 – The Label field is not valid. 1 – The Label field is valid. (If the library is not equipped with a bar code scanner, this field is 0.)
Error	Indicates whether the bar code scanner was unable to read the cartridge label, as follows: 0 – The bar code scan was successful, a reset condition occurred, or the door was opened. 60 – The bar code scanner could not read the bar code label because there was no label on the cartridge. 61 – The bar code scanner could not read the bar code label because the label was unreadable. 62 – The bar code scanner could not read the label because the magazine or tape drive is not installed. 65 – The bar code scanner could not read the label because a Direct Memory Access overrun occurred.

Element label:	
Error (*continued*)	67 – The bar code scanner could not read the bar code label because a Direct Memory Access channel time-out occurred. 69 – The bar code scanner could not read the label because the label was upside down or misplaced. (If the library is not equipped with a bar code scanner, this field is 0.)
Send Vol Match	Indicates whether the cartridge label matched the template sent with the last SCSI SEND VOLUME TAG command, as follows: 0 – The label did not match the template. 1 – The label matched the template.

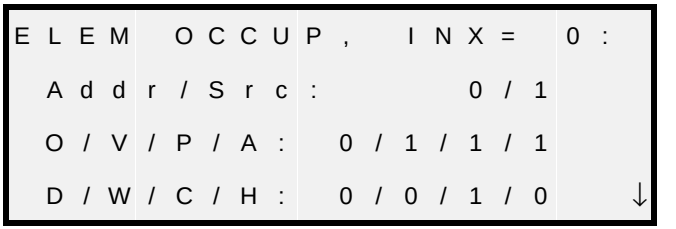
Element occupied information

1. From the Main Menu, select Library Info Menu.

2. From the Library Info Menu, select Inventory Menu. The following menu appears:



3. From the Inventory Menu, select Occupied Info. The following screen appears.



4. Press ↓ to view an element with a higher index; press ↑ to view an element with a lower index.

The following table describes the fields in the Occupied Info screen.

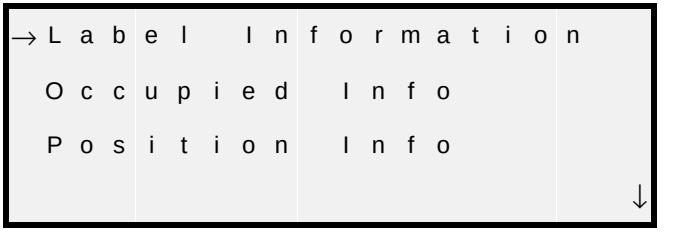
Occupied Info screen:	
INX	Displays the element index for which information is being displayed.
Addr (Address)	Shows the SCSI element address of this element.
Src (Source Element Index)	Shows the index of the last storage element from which the cartridge was moved. If this field says 255, the library doesn't know.
O (Occupied)	Indicates whether the library considers the specified element location to contain a data cartridge, as follows: 0 – The element location does not contain a data cartridge. 1 – The element location contains a data cartridge.
V (Occupied Valid)	Indicates whether the Occupied flag is valid, as follows: 0 – The Occupied flag is questionable (may not be accurate). 1 – The Occupied flag is valid.

Occupied Info screen:	
P (Cartridge Magazine or Tape Drive Present)	Indicates whether the magazine or tape drive is installed. If the element index references a storage element, this flag indicates whether the magazine is installed. If the element index references a tape drive, this flag indicates whether that particular drive is installed. The values for this flag are as follows: 0 – Not installed 1 – Installed **Note:** The library assumes the magazine is always installed.
A (Tape Drive Accessible)	Indicates whether a drive is empty, a cartridge is loaded in the drive, or the cartridge is unloaded: 0 – A cartridge may be loaded in the drive. 1 – The drive is empty, or the cartridge is ejected and ready to be picked.
D (Drive)	Indicates whether this element is a tape drive: 0 – The element is not a tape drive. 1 – The element is a tape drive.
W (Warning)	Currently not used.
C (Calibrated)	Indicates whether the element position has been calibrated: 0 – Not calibrated. 1 – Calibrated.
H (Hangout)	Indicates whether a cartridge is ejected and ready to be picked: 0 – No cartridge is ejected and ready to be picked. 1 – A cartridge is ejected and ready to be picked.

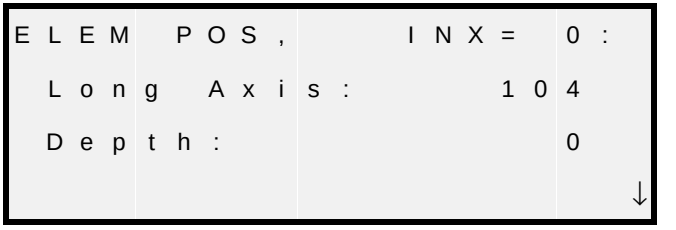
Element position information

1. From the Main Menu, select Library Info Menu.

2. From the Library Info Menu, select Inventory Menu. The following screen appears:



3. From the Inventory Menu, select Position Info. The following screen appears:



4. Press ↓ to view an element with a higher index; press ↑ to view an element with a lower index.

The following table describes the fields in the Position Info screen.

Position Info screen:	
INX	Displays the element index for which information is being displayed.
Long Axis	Indicates the distance (in thousandths of an inch) the CHM has to move along the long axis from its home position to the specified element location.
Depth	Not currently used.

Performing diagnostics

This section describes how to perform diagnostics using the Demo Menu and Diagnostics Menu from the operator panel. The Demo Menu provides options for running the library in a continuous demo mode, where the CHM randomly moves cartridges between slots and the tape drive. The Diagnostics Menu provides options for performing specific CHM movements.

Note: A service technician can also perform diagnostics using the library's internal firmware, which resides in the flash EEPROM. This firmware also allows a technician to upgrade to new library firmware and print a diagnostic listing.

Using the Demo Menu

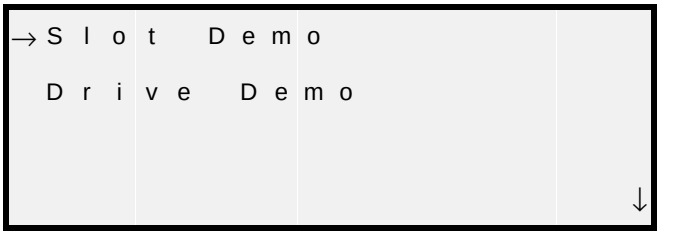
The Demo Menu includes two selections:

- **Slot Demo**. This option causes the CHM to randomly move cartridges from slot to slot, including the fixed cartridge slot.
- **Drive Demo.** This option causes the CHM to randomly move cartridges between magazine slots, the fixed slot, and the tape drive.

Starting a demo option

Before running a demo option:

1. If necessary, disable security (see page 33).
2. Change the control mode to LCD Interface (see page 45).
3. Make sure there is at least one data cartridge present and one empty slot before you begin the test.
4. From the Main Menu, select Maintenance Menu. Then select Demo Menu. The following menu appears:



Slot demo

To run the slot demo:

1. Select Slot Demo from the Demo Menu.

2. The library asks if you want cartridges scanned during the demo. If your library is equipped with a bar code scanner and you want to include bar code scanning in your demo, select YES. Otherwise, select NO.

   The system begins the demo cycles and displays the following screen:

   ```
   SLOT DEMO:
     Total Cycles: n
   Status: Move nn - nn
   ```

   In the example above, *n* indicates the number of cycles that have run so far, and *nn - nn* indicates the source and destination element indexes of the current move.

3. To abort the demo, press Escape, then Enter at the next screen. The library displays the total number of cycles that were run during the demo and an Error 91 message, indicating that you have aborted the demo.

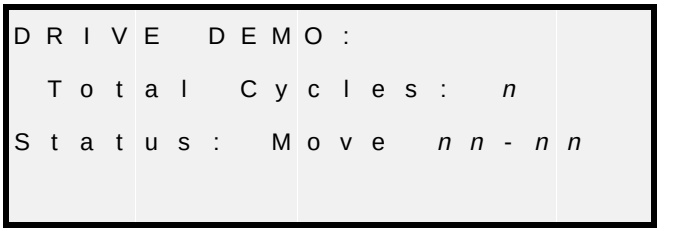
Drive Demo

To run the drive demo:

1. Select Drive Demo from the Demo Menu.

2. The system asks if you want cartridges scanned during the demo. If your library is equipped with a bar code scanner and you want to include bar code scanning in your demo, select YES. Otherwise, select NO.

   The system begins the demo and displays the following screen.



   In the example above, *n* indicates the number of cycles that have run so far, and *nn - nn* indicates the source and destination element indexes of the current move.

3. To abort the demo, press Escape, then Enter at the next screen. The system displays the total number of cycles that were run during the demo and an Error 91 message, indicating that you have aborted the demo.

Using the Diagnostics Menu

The Diagnostics Menu provides basic exercising functions for components in your library. You can use these functions to test the hardware after installation.

Starting diagnostics

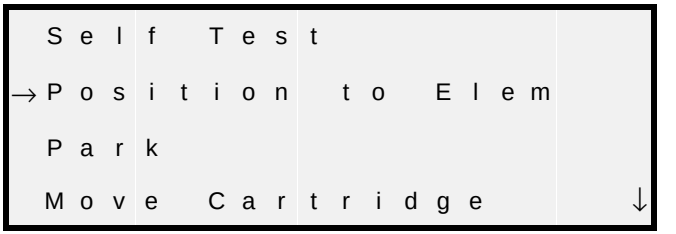
Before performing diagnostic exercises from the operator panel, do the following:

1. If necessary, disable security (see page 33).
2. Change the control mode to LCD Interface (see page 45).
3. Refer to the table below for the element indexes. These numbers correspond to the library components and are necessary for some tests.

Library Component	Element Index
Fixed cartridge slot	0
Cartridge slots	1 to 7 (See page 98 for entire numbering scheme.)
Tape drive	82
CHM	86

Performing diagnostic tests

1. From the Main Menu, select Maintenance Menu, then select Diagnostics Menu. A screen of diagnostic tests appears:



2. Select one of the tests. (Each test is described in the table starting on the next page.)

3. When the test is finished, the screen displays Status Complete and you can press Escape to return to the Diagnostics Menu.

Note: If you want to abort a test in progress, press Escape, then Enter.

The following table describes each test and also provides additional instructions for performing the tests (if applicable).

Test	Description	Additional instructions
Self Test	Causes the CHM to do the following: • Perform a Home CHM test. • Cycle the short axis once. • Cycle the long axis once. • Move the CHM to home position.	
Position to Elem	Positions the CHM in front of the tape drive, fixed cartridge slot, or a magazine slot.	When you select Position to Elem, the Set Destination screen appears. Press ↑ or ↓ to select the element index where you want to position the CHM, then press Enter.
Park	Moves the CHM to the park position (at the top of the long axis for the standalone model or the right of the long axis in the rack-mount model).	
Move Cartridge	Moves a cartridge from one location to another.	When you select Move Cartridge, the Set Source screen appears. Press ↓ or ↑ to select the source index (the slot you want the CHM to pick from), then press Enter. The Set Destination screen appears. Press ↓ or ↑ to select the destination index (the slot where you want the CHM to place the cartridge), then press Enter.
Scan	If your library is equipped with a bar code scanner, the Scan test scans all the elements. If your library is not equipped with a bar code scanner, the CHM will touch the cartridges and update the cartridge inventory.	After the system scans all the elements, it stores the data in the cartridge inventory and displays any scan errors on the Label Information screen (see page 115).

Test	Description	Additional instructions
Scan w/ Range	If your library is equipped with a bar code scanner, the Scan with Range test scans a range of bar code labels. If your library is not equipped with a bar code scanner, the CHM will touch the cartridges and update the cartridge inventory.	When you select Scan with Range, the Set Scan Start screen appears. Press ↓ or ↑ to specify an element index where you want the scanner to begin, and press Enter. The Set Scan Stop screen appears. Press ↓ or ↑ to specify an index where you want the scanner to stop, and press Enter. After the system scans the labels, it stores the data in the cartridge inventory and displays any scan errors on the Label Information screen (see page 115).
Home CHM	Causes the CHM to retract on its short axis, move to the home position (the top of the long axis for standalone models or to the right for rack-mount models), then move in front of the tape drive. This test also recalibrates the home or zero position for the long axis and short axis.	
Cycle Pick/Place	Causes the CHM to take a cartridge from a specified element and replace it in the same location.	When you select Cycle Pick/Place, the Set Source screen appears. Press ↓ or ↑ to select the source index (where you want the CHM to pick and place the cartridge). The Set Cycles screen appears. Press ↓ or ↑ to select the number of cycles you want this test to run and press Enter.
Cycle Gripper	Causes the CHM gripper to open and close the number of times you specify.	When you select Cycle Gripper, the Set Cycles screen appears. Press ↓ or ↑ to select the cycles for the Cycle Gripper test to run and press Enter.

Test	Description	Additional instructions
Cycle S Axis	Causes the CHM to move end to end along the short axis (the axis on which the CHM moves in and out).	When you select Cycle S Axis, the Set Cycles screen appears. Press ↓ or ↑ to select the number of cycles you want the Cycle S Axis test to run and press Enter.
Cycle L Axis	Causes the CHM to move end to end along the long axis (the axis on which the CHM moves left and right for the rack-mount model or up and down for the standalone model).	When you select Cycle L Axis, the Set Cycles screen appears. Press ↓ or ↑ to select the number of cycles you want the Cycle L Axis test to run and press Enter.
Cycle Solenoid	Exercises the solenoid that controls the locking mechanism on the front door.	When you select Cycle Solenoid, the Set Cycles screen appears. Press ↓ or ↑ to select the number of cycles you want the Cycle Solenoid test to run and press Enter. You will hear a click each time the solenoid extends and retracts

Configuring the serial port for library diagnostics

You can use the library's 9-pin serial port and a console interface program (such as Exabyte's CHSTERM) to access the library firmware. The console interface, also referred to as the *Diagnostic Console*, allows you to view information about the library, perform diagnostics tests, create diagnostic listings, and download new firmware.

The following table illustrates the functions you can perform using the serial port. As the table indicates, unless you want to control the motion of the CHM, you do not need to switch to 9-Pin Port control mode.

Function	Must change to 9-pin port control mode?
Controlling the CHM for diagnostic purposes	✔
Upgrading library firmware	
Creating diagnostic listings for the library	

For detailed information about using the Diagnostic Console and the serial port, refer to *Exabyte 18D Library Maintenance.*

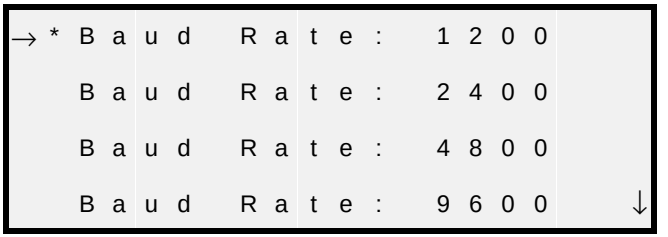
Configuring the serial port

To configure the port:

1. If necessary, disable security (see page 33).

2. If you want to control CHM motion, change the control mode to 9-Pin Port mode (see page 45).

3. From the Interface Menu, press ↓ and ↑ to select Config 9-Pin Port.



4. Press ↓ to assign one of the baud rates to the port and press Enter. An asterisk (*) indicates the current connection.

Notes

7 Troubleshooting

This chapter provides a list of suggestions for solving problems that may occur when you are installing and operating the library and the enclosed tape drive. The instructions in this chapter are basic troubleshooting guidelines. For more advanced troubleshooting, contact your service provider.

This chapter is divided into the following sections:

- Problems with library installation
- Problems with tape drive operation
- Problems with library operation

Note: If an error code is displayed on the LCD, refer to Appendix C. If LEDs on the tape drive are on or flashing, see page 58.

Problems with library installation

If your library and application software are not communicating after installation, check the following:

- ✔ **SCSI IDs.** Make sure that the SCSI IDs you selected for the tape drive and library are not the same as the ID used by any other SCSI device on that bus, including the SCSI adapter card. Refer to page 29 for information about setting the SCSI IDs.

- ✔ **SCSI cabling.** Make sure that all SCSI cables are securely connected at both ends.

- ✔ **Single-ended and differential devices.** Make sure all devices on the bus are all single-ended or differential. These devices include the controller cards and terminators.

- ✔ **SCSI cable lengths**. Make sure the SCSI cabling does not exceed maximum lengths, including internal cabling (see page 147).

- ✔ **Termination**. Make sure your bus is properly terminated as described in Appendix B. If another SCSI device previously terminated the SCSI bus and is no longer at the physical end of the bus, be sure to remove the terminator from that device.

- ✔ **Compatibility.** Make sure that your tape drive and library are compatible with the SCSI adapter card and application software you plan to use. See page 2 for more information.

- ✔ **SCSI adapter card installation.** Make sure that you installed your SCSI adapter card correctly. Refer to the documentation that came with your card for installation and troubleshooting instructions. Pay special attention to steps describing setting various jumpers and switches on the card. Make sure that the card is properly seated.

- ✔ **Software installation.** Make sure that your application software is installed correctly. Refer to the documentation that came with your software. Pay special attention to steps describing configuring the software for use with the library and tape drive.

- ✔ **Control mode.** Make certain the library is operating in the correct control mode. For most applications, the control mode should be set to SCSI Interface. See page 43 for more information.

After checking the items above, reset the library as described on page 54.

Problems with tape drive operation

If you have been successfully operating the application software and library in the past, but are now experiencing problems reading and writing data, check the following:

- ✔ **Write-protect switch**. If you are writing data, make sure the cartridge is write enabled (make sure the orange rectangle is not visible).

- ✔ **Cartridge type**. Make sure you are using a supported data cartridge for your tape drive model.

- ✔ **Density.** You cannot change the data format (or "density") on a single tape. If you want to change the data format, you must change it at the beginning of tape (BOT).

- ✔ **Cartridge age**. If the cartridge has been in use for a long time or if it has been used frequently, try using a new cartridge.

- ✔ **Cleaning**. Clean the tape drive as described on page 67. Make sure you are using the recommended cleaning cartridge for your tape drive.

Problems with library operation

If the library has been successfully operating in the past, but is now experiencing problems, check the following:

- ✔ **Control mode**. If you are using an application software package to control CHM operations, the library must be set to SCSI Interface mode. See page 43 for more information. If you are trying to operate the library in sequential mode, be sure to read Appendix D.

- ✔ **Bar code labels.** If the library is not reading the bar code labels correctly (missing or extra characters), make sure that the Chksum Labels option is set correctly (see page 35). Also, make sure that you have not mixed labels that contain checksum characters with labels that do not contain checksum characters, as described on page 15.

- ✔ **Security**. Make sure that security is set correctly for the operation you are trying to perform. If security is enabled, you cannot perform many operations using the operator panel and you cannot open the door. Security can be enabled from the operator panel (see page 30) or from your application software with a SCSI MODE SELECT command.

- ✔ **Door open**. Make sure the door is closed and locked. You can check the Door Closed and Key Lock lines on the System Sensors screen to determine if the door and key lock sensors are properly working (see page 110).

- ✔ **CHM operation**. You can use the selections in the Diagnostics Menu and the Demo Menu to determine if the CHM is functioning properly. See page 121.

- ✔ **Fuse**. Make sure the fuse is good. See page 73.

Notes

A Specifications

This appendix provides general specifications for the library, including:

- Storage capacities
- Overall specifications
- Power cord requirements
- SCSI cable specifications
- SCSI terminator requirements

Storage capacities

The table below summarizes the storage capacity of the library.

Capacity with the following tape drives with 8 data cartridges...*	
DLT 4000	**DLT 7000**
320 GB	560 GB

* Assumes that the tape drives are writing data at a 2:1 compression ratio.

Overall specifications for the library

General specifications	
Interface:	SCSI-2
Maximum sustained data transfer rate:*	DLT 4000: 3.0 MB/sec., compressed DLT 7000: 10 MB/sec., compressed
Size and weight	
Size (rack-mount model):	8.6 high × 19.0 wide × 21.1 long (inches) (21.98 × 48.26 × 53.67 cm)
Size (standalone model):	22.0 high × 9.4 wide × 21.4 long (inches) (55.88 × 24.0 × 54.36 cm)
Weight (rack-mount fully loaded):	78.7 lb
Weight (standalone fully loaded):	106.7 lb
Operating environment	
Ambient temperature:	+ 10°C to + 35°C (+ 50°F to + 95°F)
Relative humidity:	20% to 80%, noncondensing
Wet bulb:	26°C (79°F) max
Power	
Input voltages:	Accepts 90 to 259 VAC at 48 to 62 Hz; automatic input voltage selection
Power consumption:	65 watts minimum; 155 watts maximum
BTU consumption:	222 BTU/hour minimum; 529 BTU/hour maximum

* Assumes a 2:1 compression ratio.

Power cord requirements

The library is shipped with a seven-foot (2.1 meter), 18 AWG, 3-conductor AC power cord for 120 volt use in the United States and Canada. The power cord has a molded NEMA 5-15P male connector on one end and a molded IEC 320 female connector on the other end. The power cord is UL Listed and CSA Certified.

Other voltages and international use

If you are planning to use an input voltage other than 120 volts AC or if you plan to use the library outside of the United States or Canada, you must supply your own power cord.

Criteria for U.S. and Canadian 220 VAC power cord

- It must have a molded NEMA 6-15P attachment plug on one end.
- It must have a molded IEC 320 female connector on the other end.
- The cordage must be an SJT or SVT type, 3-conductor, 18 AWG minimum.
- The power cord must comply with local electrical code.

Criteria for international 220 VAC power cord

- It must have an attachment plug of the proper type, rating, and safety approval for the intended country.
- It must have an IEC 320 female connector on one end.
- The cordage must be adequately rated and harmonized to CENELEC publication HD-21.

SCSI terminator specifications

The SCSI terminator must match the SCSI bus configuration (that is, differential or single-ended, and wide or narrow). In addition, all termination must be external. Do not use internal terminators to terminate the library or the tape drive.

To ensure proper performance of the library and tape drive, Exabyte recommends one of the following external terminators:

Single-ended narrow external terminator:

- AMP™ Amplimite™ 750381-1 (active)

Single-ended wide external terminator:

- AMP Amplimite 869516-1 (active)

Differential narrow external terminator:

- AMP Amplimite 749541-1

Differential wide external terminator:

- AMP Amplimite 869515-1

SCSI cable specifications

The following tables list the recommendations for external SCSI cables for the library.

Wide SCSI cables
Use cables that conform to SCSI-3 specifications.

Narrow SCSI cables	
Standard Construction	50 conductors (25 twisted pairs)
Primary Conductors	Gauge: # 28 AWG minimum stranded (7/34) annealed, tinned copper
	Insulation: Polypropylene 0.010 inch nominal
Shielding	80% minimum tinned copper braid over aluminum/mylar foil
Voltage Rating	30 VAC
Impedance	Single-ended: 88 Ohms ± 8 Ohms Differential: 130 Ohms ± 12 Ohms
Grounding	Case-to-case grounding
Connector	50-contact AMP Amplimite 0.050 male, shielded, SCSI-2 connector

Cable length for single-ended configurations

If your host can transfer data at more than 5.0 MB per second, the maximum allowable bus length is 3 meters (9.8 feet). If your host transfers data at 5.0 MB per second or less, the maximum allowable bus length is 6 meters (19.7 feet).

Cable length for differential configurations

The total length of all internal and external cables on the SCSI bus should not exceed 25.0 meters (82 feet).

Determining the cable length for each bus

To determine the cable length of the bus, measure the lengths of the SCSI cables connecting each device to that bus and add those lengths together. That is the total length of external cable.

B SCSI Configuration

This appendix provides an overview of the *Small Computer System Interface 2* (*SCSI-2*) and gives an overview of how to configure the SCSI bus. *SCSI* is a standard specification that allows an application running on a host computer to communicate with peripheral SCSI devices, such as the library and the enclosed tape drive. The library uses SCSI commands to receive instructions from the host and to report its status to the host.

SCSI components

The SCSI system consists of the following components:

- **Initiator.** The host computer system acts as the initiator of commands. It consists of the application software, the operating system, the device driver, and the SCSI adapter card.

- **Bus.** The SCSI cables connected to the adapter card and to the library (as well as other devices on the bus) provide a pathway (or “bus”) for passing commands.

- **Targets.** The library and the tape drive are peripheral devices (or targets) that are capable of receiving commands from the host. For example, up to eight devices can be connected along a narrow SCSI bus (including the host computer), in what is referred to as a *daisy chain*. A wide SCSI bus can accommodate up to 16 devices.

Installing the library on the SCSI bus

This section provides the basic rules and considerations for setting up the library on the SCSI bus.

Single-ended or differential

Every SCSI device attached to the SCSI bus must be of the same type: either *single-ended* or *differential*. On a single-ended SCSI bus, one signal line is used to transmit a bus signal between devices. On a differential bus, two signal lines are used.

If your library is single-ended, then all devices you install on the SCSI bus must also be single-ended; if your library is differential, all devices must be differential. These other devices include the tape drive installed in the library, the adapter card installed in your host computer, and terminators.

Narrow or wide SCSI

The Exabyte 18D supports wide or narrow SCSI. The DLT 4000 supports narrow SCSI only; the DLT 7000 supports wide SCSI only.

Note: If you are using another supported DLT tape drive, check the tape drive documentation to determine whether it supports wide SCSI or narrow SCSI.

Fast SCSI

The library supports fast SCSI, which does not require any special cabling or configuration. However, proper cable lengths, stub length, and termination are more important on a fast SCSI bus than on a regular SCSI bus.

SCSI cabling

When connecting the library and other devices on the SCSI bus, follow these guidelines for SCSI cabling:

- ✔ **Single-ended configurations**. If you are using fast SCSI, make sure that the total length of all internal and external cables does not exceed 9.8 feet (3.0 meters). If you are not using fast SCSI, make sure that the total length of all internal and external cables does not exceed 19.7 feet (6.0 meters).

- ✔ **Differential SCSI cable lengths**. Make sure the total length of all internal and external cables on the SCSI bus does not exceed 82 feet (25.0 meters)

- ✔ **Internal cabling**. The library uses 8.5 inches (22 cm) of internal SCSI cable; the tape drive uses an additional 2 inches.You must include this amount in your calculations. If you have any other external devices on the bus (not installed inside your host computer), these devices may have some amount of internal SCSI cabling as well.

Termination

If the library or tape drive is the last device on the SCSI bus, you must attach a terminator to one of the two SCSI connectors at the back of the library.The SCSI terminator must match the SCSI bus configuration (differential or single-ended, wide or narrow).

Termination can be active or passive. For best results on a single-ended bus, use active termination.

SCSI IDs

Each device on the SCSI bus must have a unique ID. The host computer uses these IDs to identify each device. The SCSI ID also determines which device has priority when more than one device is trying to communicate with the host. The lower the ID, the lower the priority of the device.

Note: The SCSI ID does not depend on physical location. For example, the last device on a multi-device SCSI bus can have a SCSI ID of 2.

The library and tape drive each use one SCSI ID, totalling two for the unit. Separate IDs allow the library and tape drive to operate as independent devices, receiving different sets of SCSI commands from the host.

C Error Codes

This appendix describes the error codes that appear on the library's LCD (liquid crystal display). LCD error codes do not reflect tape drive errors. For tape drive errors, refer to page 58.

CAUTION

Library components can be replaced only by Exabyte-approved service providers. If you cannot find an obstruction or other obvious cause for the problem, contact your service provider. Unless you have a self-maintenance contract, do not attempt to replace any components. If you do, you will void your warranty.

For information about SCSI error conditions (sense data), refer to page 101 and to the *Exabyte 18D Library SCSI Reference*.

CAUTION

Some corrective actions advise you to reset the library. Before resetting, make sure there is no SCSI activity on any connected SCSI bus, so you do not disrupt communications.

The following table lists the library hardware error conditions in numerical order.

Error no.	Description	Corrective action
10	DROPPED A CARTRIDGE. The CHM dropped a cartridge.	Put the cartridge back in the magazine if you know where it goes and reset the library. If the problem occurs again, contact your service provider. **CAUTION:** Do not try to put the cartridge back in the CHM gripper.
11	SOURCE EMPTY. There is no cartridge in the source location.	Install a cartridge in the source location or redirect the CHM to another location.
12	DESTINATION FULL. A cartridge already exists in the destination location.	Remove the cartridge from the destination or redirect the CHM to another location.
13	PUT FAILURE. The CHM could not successfully place a cartridge because of mechanical problems.	Make sure there is nothing blocking the CHM or the tape drive. If the error persists, contact your service provider.
14	PICK FAILURE. The CHM could not successfully pick a cartridge because of mechanical problems.	

Error no.	Description	Corrective action
15	NO SRC ELEMENT; NO DEST ELEMENT. No data cartridge magazine was installed at the selected location.	Install a data cartridge magazine or redirect the CHM.
16		
17	CHM FULL BEFORE MOVE. There was a cartridge in the gripper when the operator powered-on or reset the library, or before a move operation.	Remove the cartridge and put it back in the cartridge magazine if you know where it goes. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
18	SRC INSIDE DRIVE. The CHM could not successfully pick a cartridge because it was still loaded in the tape drive.	Use the Open Tape Drive option on the operator panel. See page 62.
19	PICK ERROR. The CHM could not successfully pick from a full cartridge slot.	Open the door and look for anything that might be obstructing the gripper. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
21	GRIP HOME ERROR. A gripper error occurred.	
22	GRIP MOTION TIMEOUT. A gripper motion took longer than the maximum time allocated for it. When motion functions do not complete in the allocated time, the current to the servo motors is shut off.	

Error no.	Description	Corrective action
26	CANNOT OPEN GRIPPER. The gripper could not open.	Open the door and look for anything that might be obstructing the CHM gripper. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
30	S AXIS DOES NOT MOVE. The CHM could not move along the short axis.	
31	S AXIS FAILED HOME. The CHM could not return to the home position along the short axis.	
36	S LM629 RESET FAILURE. The library could not reset the servo chip for the short axis.	Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
38	CANNOT LOAD DRIVE. The CHM could not load the cartridge into the tape drive. (It could not move in far enough on the short axis.)	▪ Open the door and look for anything that might be obstructing the CHM along its short axis. ▪ Make sure that a cartridge is not already loaded in the tape drive. ▪ Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
40	L AXIS DOES NOT MOVE. The CHM could not move along the long axis.	Open the door and look for anything that might be obstructing the CHM gripper. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
41	L AXIS FAILED HOME. The CHM could not return to the home position on the long axis.	
46	L LM629 RESET FAIL. The library could not reset the servo chip for the long axis.	Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the problem persists, contact your service provider.

Error no.	Description	Corrective action
60	NO LABEL. The bar code scanner could not read the bar code label because there was no cartridge.	If present, these errors appear on the Label Info screen. ▪ If the cartridge does not have a label, place a label on the cartridge. ▪ If the cartridge does have a label, reposition or replace it. ▪ If the label does not contain a checksum character (see page 15), make sure the Chksum Labels option is off (see page 35). ▪ If the error persists, contact your service provider.
61	READ ERROR. The bar code scanner could not read the bar code label because the label was unreadable or because the Chksum Labels option was on and there was no checksum character on the label.	
62	NOT PRESENT. The bar code scanner could not read the bar code labels because there was no data cartridge magazine present.	If present, this error appears on the Label Info screen. If necessary, install a data cartridge magazine.
65	DMA OVERRUN. The bar code scanner could not read the bar code label because a Direct Memory Access overrun occurred.	If present, this error appears on the Label Info screen. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
67	DMA CH. 2 TIMEOUT. Controller card error.	
69	LABEL UPSIDE DOWN. The bar code scanner could not read the bar code label because the label is upside down.	If present, this error appears on the Label Info screen. Remove the label and reposition it on the cartridge as shown on page 15. If the label is positioned correctly, contact your service provider.

Error no.	Description	Corrective action
70	L SERVO TIMEOUT. The CHM could not reach its destination along the long axis.	Open the door and look for anything that might be obstructing the CHM along its long axis. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
71	PARAMETER> LIMIT. Firmware error.	Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider. You may be asked to supply a diagnostic listing, and you may need new firmware.
72	FRONT DOOR OPEN. The front door is open or the door solenoid is malfunctioning.	▪ Close and lock the door. ▪ If the error still appears, make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. ▪ If the error persists, contact your service provider.
73	S SERVO TIMEOUT. The CHM could not reach its destination along the short axis.	Open the door and look for anything that might be obstructing the CHM along its short axis. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
74	CART. INACCESSIBLE. The CHM is unable to pick the cartridge from the tape drive.	The cartridge may still be loaded in the tape drive. Use the Open Tape Drive command to unload the cartridge and open the tape drive (see page 62).

Error no.	Description	Corrective action
75	INTERNAL S/W ERROR. Firmware error.	Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider. You may be asked to supply a Diagnostic listing, and you may need new firmware.
76	POS ERROR TIMEOUT. The CHM could not reach its destination along the long axis.	Open the door and look for anything that might be obstructing the CHM along its long axis. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
77	INTERFACE DISABLED. The library was not in the correct control mode when the operator sent a command.	Make certain you have set the correct control mode. If it is, contact your service provider.
78	PICK STALL. The CHM cannot pick the cartridge from the tape drive because the cartridge is stuck.	Use the Open Tape Drive command to unload the cartridge and open the tape drive. If the problem persists, remove the tape drive from the library and return it to your service provider. **CAUTION:** Do not try to manually remove the data cartridge.
79	SAXIS NOT RETRACTED. The CHM did not move to home before the current servo command was attempted.	Open the door and look for anything that might be obstructing the CHM along its short axis. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.

Error no.	Description	Corrective action
91	OPERATOR ABORTED. A diagnostic was aborted while it was in progress.	No corrective action required.
97	DRIVE NOT INSTALLED. The tape drive could not be cleaned because no tape drive is installed.	This error only appears when you are using the Clean Tape Drive option. Make sure the tape drive cables are properly seated. If the error persists, contact your service provider.
101	DRIVE ONLY COMMAND. Firmware error.	Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider. You may be asked to supply a Diagnostic listing, and you may need new firmware.
102	DRIVE NOT READY. The CHM cannot open the tape drive door because the tape drive is not ready.	Use the Open Tape Drive command, described on page 62, then retry the current operation.
103	DOOR WON'T CLOSE. The CHM cannot close the tape drive door.	Open the library door and look for anything that might be obstructing the CHM along its short axis. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
104	DRIVE DID NOT EJECT. The CHM timed out waiting for a tape drive to eject a cartridge.	There may be a problem with the tape drive. Call your service provider.

Error no.	Description	Corrective action
105	DOOR WON'T OPEN. The CHM cannot open the tape drive door.	Open the library door and look for anything that might be obstructing the CHM along its short axis. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
109	CHECK CLEANER. The cleaning cartridge was ejected immediately after being loaded into the tape drive.	Replace the cleaning cartridge. If the error persists, contact your service provider. **Note:** This error displays only if the cleaning was requested from the operator panel.
130	FAS216 ERROR; SCSI UNEXPECTED INT; SCSI INT STUCK ERROR. There is a SCSI chip failure.	Make sure all devices (including terminators) are either single-ended or differential. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider. You may be asked to supply a diagnostic listing; you may need new firmware or a new controller card.
131		
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190	HIT CART IN DEST. The CHM attempted to move a cartridge to an occupied position.	Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.

Error no.	Description	Corrective action
192	DRIVE COMM ERROR. The library and tape drive are not communicating.	If you just replaced the tape drive, make sure the tape drive cables are seated properly. Make sure the library and tape drive are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
193	DRIVE JMPR INSTALLED. An invalid configuration has occurred.	Call your service provider.

D Sequential Operation

This appendix describes how you can operate the library in sequential control mode.

Note: EXAFacts™, Exabyte's fax-on-demand system, and Exabyte's Internet site provide documents that describe how the library responds to common interruptions when operating in sequential mode.

How sequential operation works

When the library is operating in sequential mode, its internal firmware instructs the CHM to move cartridges sequentially between the cartridge slots and the tape drive. (The fixed cartridge slot is not included.) No application software is required to support cartridge pick and place functions.

In sequential mode, the CHM does the following:

1. Picks the cartridge from slot 1 and places it in the tape drive. If the slot is empty, the CHM picks the next cartridge in the magazine.

2. Waits until the tape drive unloads the cartridge, then picks the cartridge and returns it to its original slot.

3. Repeats these steps for the next cartridge until it has processed all of the cartridges.

4. Depending on how the *Loop* option is set, either returns to the first cartridge and begins the process again, or stops. The Loop option is described on page 162.

Sequential options

Sequential options are Restart, Loop, and Set Next Cart to 1. Set next cart to 1 is a one-time command. Restart and Loop are operating modes and retain their settings across a reset or power cycle.

Restart option

The Restart option determines where the library restarts after it is reset or power cycled, or after the door is opened and closed. The library can restart either at the beginning of the cartridge sequence or where it left off when the interruption occurred.

Before the library restarts...

Before restarting, the library performs the following actions:

1. If the CHM was moving a cartridge, it finishes the move. (This includes inserting the cartridge into the tape drive if the CHM was moving a cartridge to the tape drive.)

   Note: If you attempted to open the door, the library does not release the door interlock until it has completed the move.

2. The library performs a power-on self-test (POST). If you opened the door, the library performs its POST after you close the door.

3. If a cartridge is in the tape drive, the CHM waits for the cartridge to be unloaded, then returns it to its original slot.

As shown in the following tables, the Restart option determines what the library does next.

If Restart is...	The library...
On	Restarts at slot 1.
Off	Resumes where it left off.

Loop option

The Loop option determines what the library does after it has finished processing the last cartridge in a sequence. The following table shows the options.

If Loop is...	the library...
On	Returns to cartridge 1 and starts processing the cartridges again.
Off	Stops processing cartridges and waits for operator intervention.

Operator intervention typically means opening the library's door, removing the cartridge magazine, installing a new magazine, and closing the door

Resetting sequential processing

If you want to resume sequential processing from the first cartridge, select "Set next cart to 1" from the Sequential Options menu. Then, open and close the door or reset the library to begin sequential operations.

Avoiding interruptions

Although the library has effective methods for resuming sequential mode operation, it is best to avoid interruptions when the library is operating sequentially. In particular:

- **Do not reset or power cycle the library unless absolutely necessary**. Reset the library only to clear certain error conditions and power off the library only to perform maintenance or to store it. Avoid resetting or power cycling the library when a cartridge is in the tape drive or the CHM.

- **Do not open the door unless absolutely necessary**. During operation, open the door only to replace the magazine after the library has processed all the cartridges. Never force the door. The library will not release the door until it has completed a cartridge move or load already in progress. Certain applications may also prevent the door from being opened.

- **Do not remove a cartridge from the tape drive or insert a cartridge into the tape drive**. If you want to remove a cartridge, wait until the CHM has placed it in the magazine before removing it. If you want to add a cartridge, add it directly to the magazine.

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